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NOVEMBER 1934

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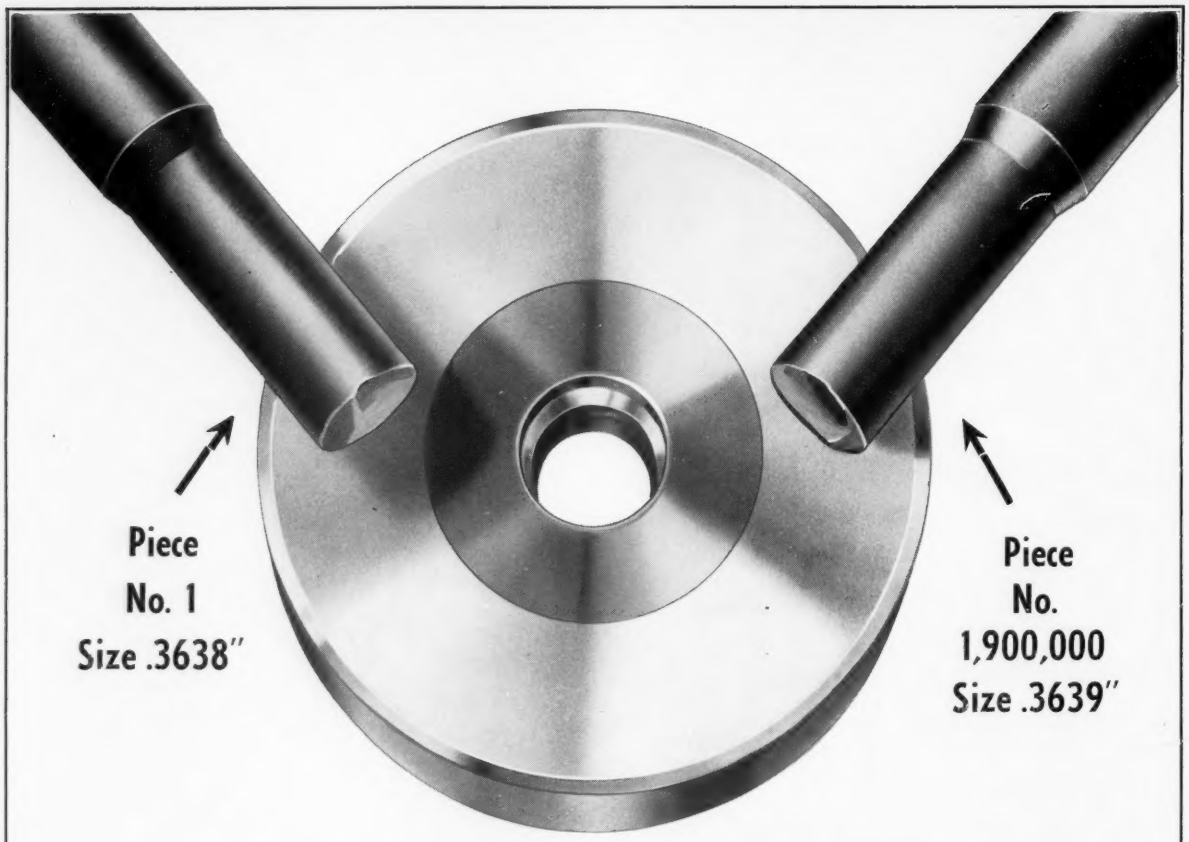

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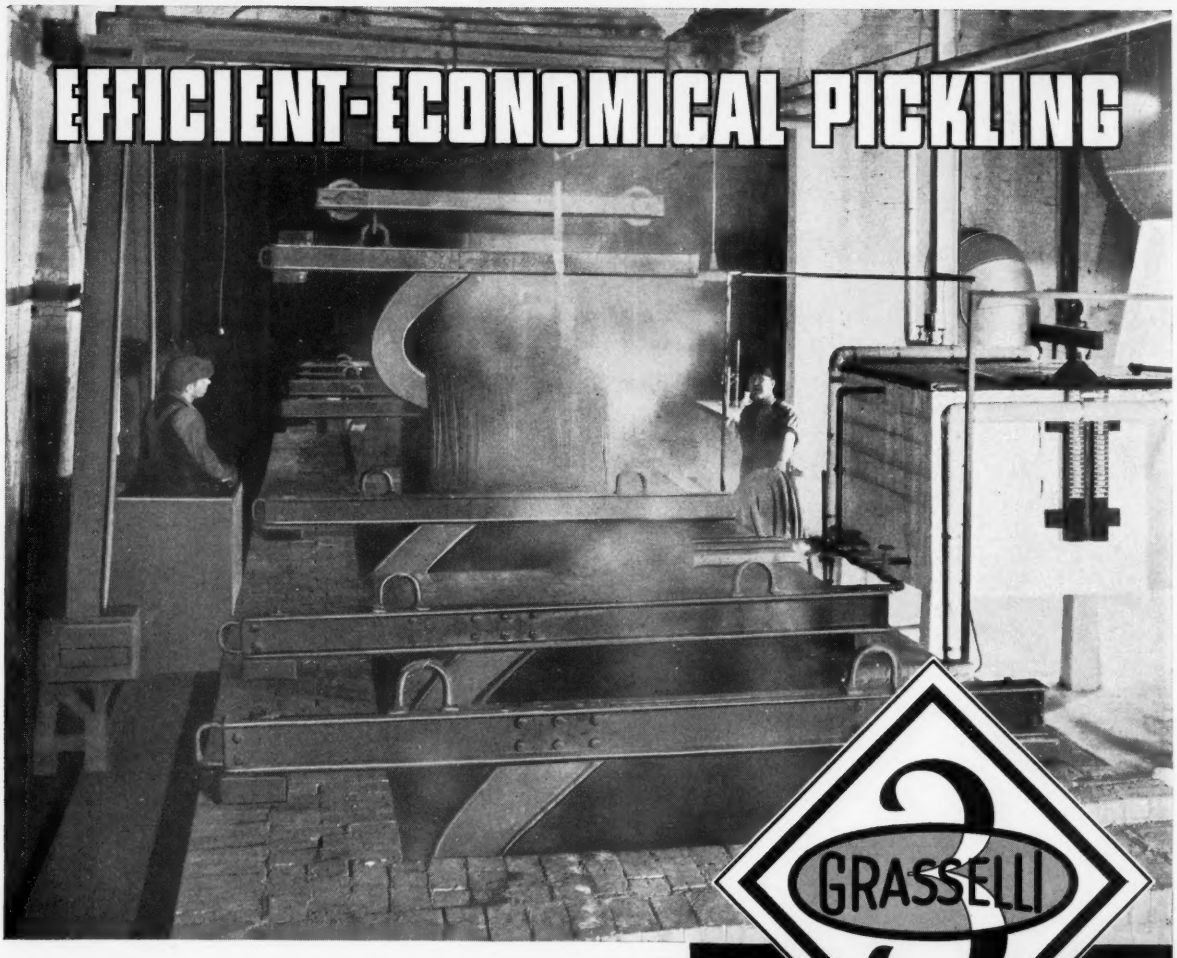

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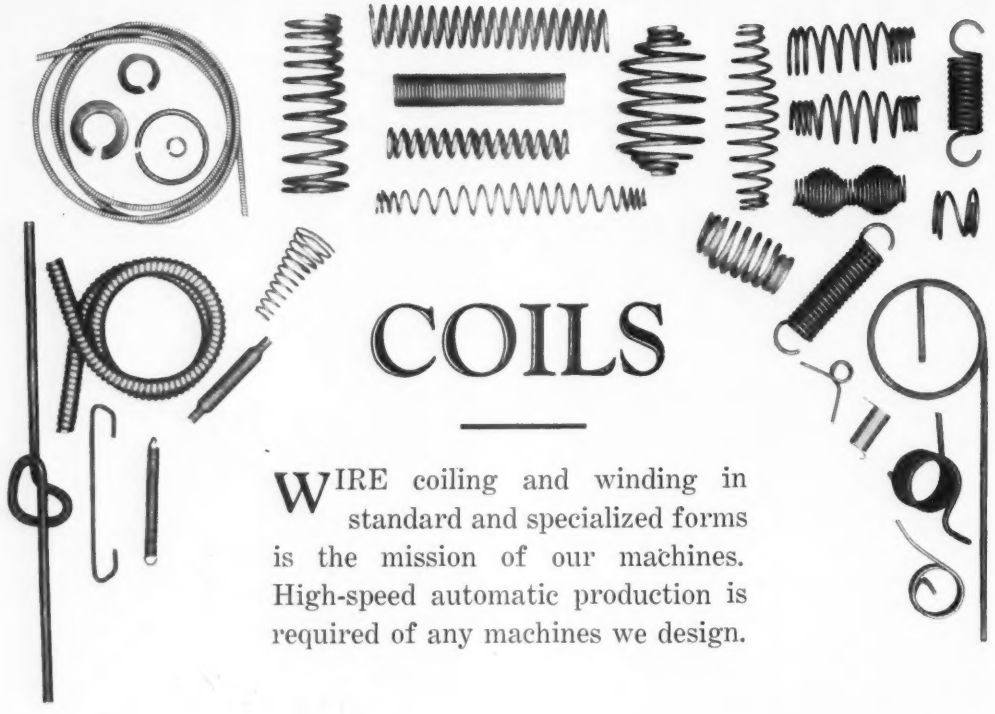

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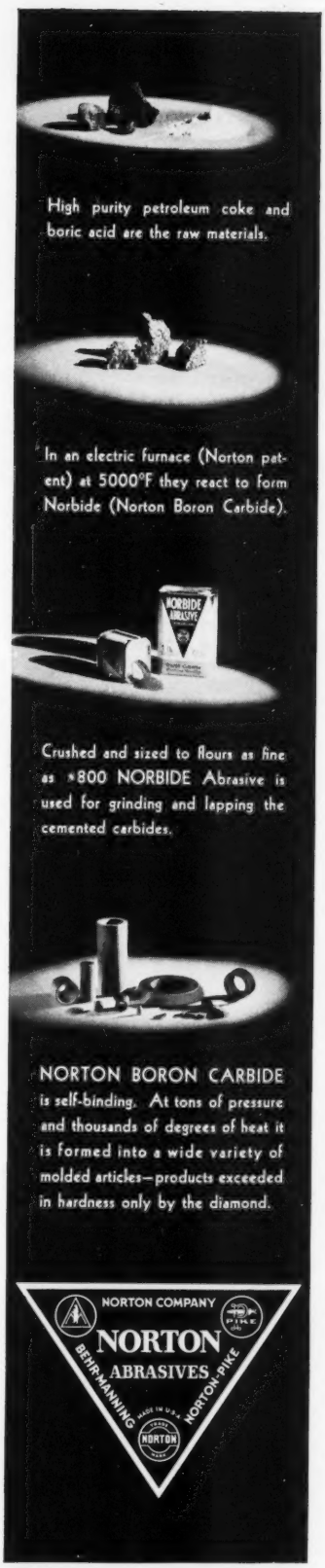
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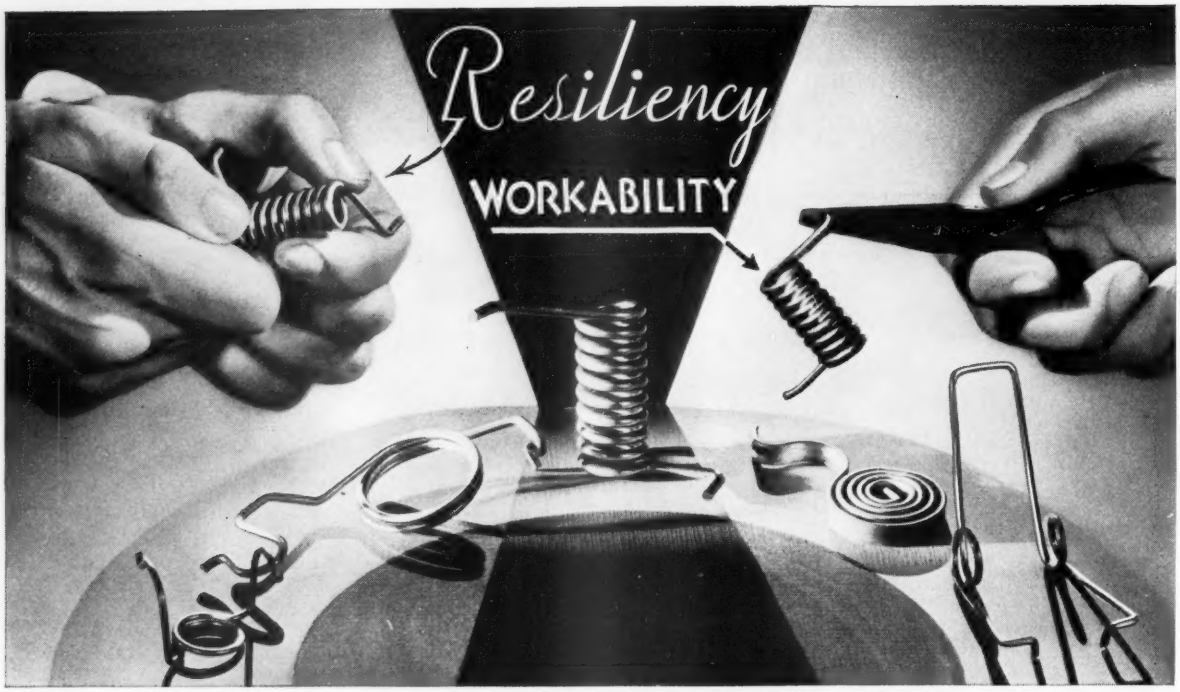

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WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip Wire Products and Insulated Wire and Cable.

DRAWING—ROLLING—EXTRUDING—FORMING—FABRICATING

Vol. 9 November 1934 No. 11

Designated as

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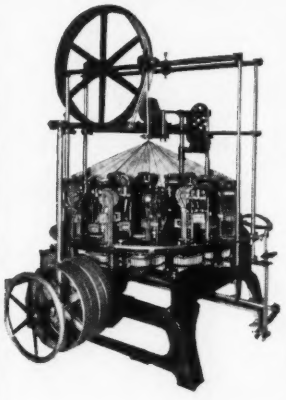

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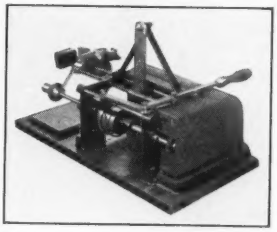

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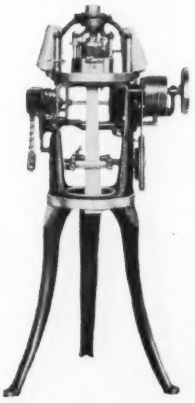

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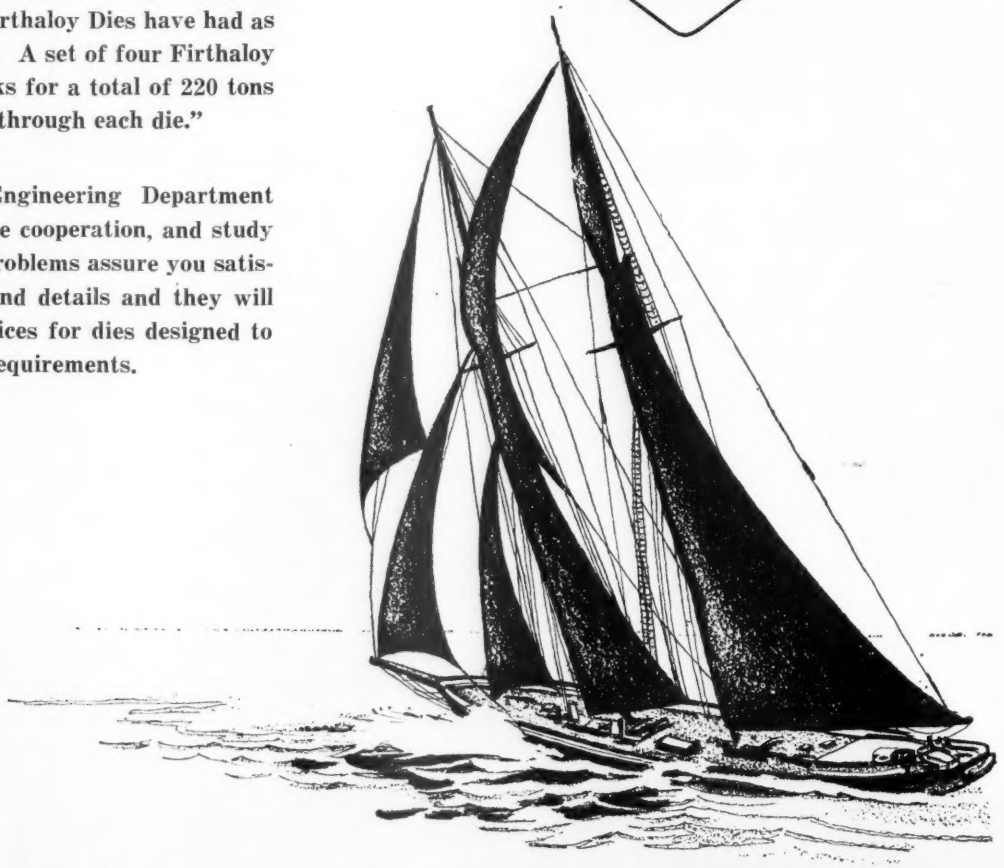

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WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
Wire Products and Insulated Wire and Cable.
DRAWING --- ROLLING--- EXTRUDING --- FORMING --- FABRICATING

Vol. 9 November 1934 No. 11

A New Process For The Cleaning of Metals

By U. C. Tainton

Technical Director, Tainton Research Laboratories, Baltimore, Md.

Nascent Metallic Sodium is liberated at the surface of the article by Electrolysis in a bath of Fused Sodium Salt producing in a few seconds a completely continuous metal surface with no non-metallic inclusions. A paper presented before Wire Association at New York Oct. 2, 1934.

IN 1928 at Kellogg, Idaho, the Sullivan Mining Company commenced the first production on a commercial scale of what has since come to be known as specially high-grade zinc. The process employed is electrolytic, using a high current density and a strongly acid electrolyte. The zinc produced is of a purity exceeding 99.995%, which means that the amount of contaminant is only about one-tenth as much as that present in the best zinc available before the plant started operations, and only about one-four hundredth of that present in common zinc. Zinc of this grade, i. e. "99.99% plus", has in the last few years become standard for the production of zinc-base die-castings which enter so largely into the construction of the modern motor car.

✦ ✦ ✦

TWO or three years ago it was decided to apply the same process as that used at Kellogg to the production of zinc coatings on steel. The first application of the process was in the wire field, and a plant has been in operation at Sparrows Point, Md., since the early part of last year. At this plant the process used is identical with that employed for the production of the very high purity metal mentioned above, except that the zinc is plated directly upon the article to be galvanized instead of being made into a thick deposit which can be melted and cast into ingots.

✦ ✦ ✦

THE raw material may be almost any zinc bearing substance: usually it consists of roasted zinc concentrate. This is dissolved in the return electrolyte coming from the cells which contain about 250 gm/L of free acid. This dissolves the zinc and also the copper, cadmium, etc., leaving a residue containing the iron, silica, lead, silver, gold, etc. The solution is then purified and goes forward to the cells where it is electrolysed using anodes of silver-lead alloy and cathodes of the wire being galvanized. This results in the deposition on the wire of a uniform layer of high purity zinc which can be carried to any desired thickness.

THE advantages of the product and the details of the process have already been brought out in other places. In this paper it is proposed to describe briefly what is believed to be a new method for obtaining a continuous metallic surface on the wire before it passes to the cell in which the pure zinc coating is formed.

✦ ✦ ✦

IN applying our electrolytic zinc process to the galvanizing of steel the greatest difficulty encountered was in connection with the proper preparation of the surface of the wire for plating. It is an axiom of electro-chemistry that a perfect deposit cannot be obtained unless the cathode surface is entirely clean. Particularly in the case of certain sorts of wire we found it impossible to obtain such a surface by the use of any of the known methods of pickling. Wire is apt to contain insoluble inclusions of magnetic iron oxide, slag, etc., which have been drawn or rolled into the steel, and cannot be dislodged by processes which depend upon the disruptive effect of gas bubbles, whether these are obtained electrolytically or by the attack of the metal surface itself.

Designated as Official Publication by the Wire Association

IT was found that even though a deposit might appear perfect to the eye, yet examination with a glass would almost always disclose pinholes, unplated cracks and other defects. While these are not so serious in the case of zinc as in those of other metals yet one could not feel satisfied to apply a coating of 99.99% purity unless corresponding standards were attained with regard to continuity.

✦ ✦ ✦

NEARLY two years of intensive research work resulted finally in the development of a process which is radically different in principle from former methods. (*) The active cleaning agent consists of nascent metallic sodium. This is liberated at the surface of the article by electrolysis in a bath of fused sodium salt. On account of the intense affinity of sodium for oxygen it will reduce back to metal the oxide on any ordinary oxidized metal surface, regardless of its composition. The process is as rapid and effective on metal such as nickel, chromium, etc., as it is on plain steel. Under proper conditions a few seconds only is required to produce a completely continuous metal surface with no non-metallic inclusions.

✦ ✦ ✦

IT will be clear from what has been said that the process is susceptible of a great many variations and can be adapted for a variety of different requirements. At the Sparrows Point plant the wire on its way to each galvanizing cell passes through a steel trough containing fused sodium hydroxide and carbonate. Other salts may, of course, be employed for particular conditions. The wire is made the cathode and this results in the liberation of nascent sodium metal which reduces oxide back to metallic iron. Other impurities such as sulphur, silica, carbon, etc. are also removed. The resulting cleaned surface consists of substantially pure iron and is very much less subject to rusting than steel pickled with acid.

✦ ✦ ✦

IT appears from experience that the process offers the following advantages, especially for surfaces difficult to deal with in the ordinary way:

1. **It produces a cleaner and more uniform surface than can be done by other methods, and consequently allows the production of better coatings, whether the steel is to be plated, tinned, enamelled, painted or otherwise treated.**
2. **The process employs no acid and consequently eliminates the problem of disposal of waste acid and ferrous sulphate. The consumption of chemicals is small since the action consists in the setting free of sodium and this promptly combines with the oxygen to form sodium hydroxide over again. The only soda used, therefore, is that carried out on the surface of the steel. This may be readily recovered and returned to the process.**
3. **The process avoids the loss of weight the steel undergoes in acid pickling. Particularly in the case of alloys this is often an important cost factor.**
4. **The nature of the process precludes the possibility of embrittlement of the steel through absorption of hydrogen.**
5. **By the use of appropriate salts and proper temperatures, the steel may be given heat treatment such as annealing, tempering, etc., at the same time as it is being cleaned.**
6. **The process completely cleans metal surfaces from all organic material so that no preliminary degreasing step is necessary.**
7. **The process can be used to take the place of sand-blasting in nearly all cases; particularly effective as a preliminary to inspection to show defects in welds, castings, etc.**
8. **Steel cleaned by this process may be stored, transported, etc., without the rusting which occurs immediately after acid-pickling. This makes it unnecessary to do the pickling immediately before the article is to be coated, permitting simplification of manufacturing plant flow-sheets.**

✦ ✦ ✦

Cost Comparisons

AS regards costs, the principal item is for fuel and power. The normal power requirement is from 5-20 K.W.H. per ton of metal cleaned according to the amount of cleaning necessary. As to fuel, it requires about a gallon of oil, or its equivalent, for heating each ton of steel. To this must be added losses due to radiation, etc. In a well designed furnace these should not exceed more than four times the amount of heat usefully employed and may be substantially less. As previously mentioned, these may be a credit against this fuel cost where it is desired to temper, anneal or heat-treat.

✦ ✦ ✦

WITHOUT any recovery of the sodium salt the amount consumed ranges between 5 and 10 pounds of soda per ton of wire. By washing and recovery it should be simple to reduce this loss by at least four-fifths.

✦ ✦ ✦

SUMMING up these items it appears that under normal conditions one may look for a cost of 25-50c per ton of metal treated.

✦ ✦ ✦

THE process is yet in its infancy and the large new field which it opens up has been only superficially reconnoitered. The writer will be glad to collaborate with those who may wish to test the process especially in regard to new fields of application.

*U. S. and foreign patents pending.

PROCEEDINGS
AND DISCUSSIONS
AT THE 1934
Wire Association Meetings

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THE
WIRE ASSOCIATION
17 E. 42ND ST., NEW YORK, N. Y.

The Wire Association Technical Meetings

Some High-Lights of the Discussions at the 1934 Wire Association Meeting at New York, N. Y., Oct. 1-5, 1934.

THE fourth Annual Meeting of The Wire Association which passed into history on October 4th made new records in registration and in general interest as shown by wide participation in the discussions at technical sessions. The sessions were held on Tuesday, Wednesday and Thursday, morning sessions being devoted chiefly to steel and afternoon sessions chiefly to non-ferrous metals. Chairman Westphal of the Program Committee offered an excellent array of papers, introduced the Chairman of the various sessions, and presided ably over the first session. The same may be said of Chairman Grassell, Braley, Fast, Anderson and Kent. The discussion type of meeting introduced in 1932 has taken firm root.

✦ ✦ ✦

In Opening The Sessions, John Mordica, President of The Association, Said:

"WE meet again, at this, our fourth convention of the Wire Association. It is indeed a pleasure to have so many in attendance, so that here, we may welcome new acquaintances and renew old friendships. While this is not all that we are here for, it is a very pleasant part of the program.

✦ ✦ ✦

I AM happy to state that during the past year we have had the cooperation of a very active executive committee, and I am sure that each and every one of you feel as I do, that this committee has accomplished something worthwhile. May I also congratulate the program committee on the program that has been arranged for this meeting, as it must have taken a great deal of time and work, and I know that you will enjoy it.

✦ ✦ ✦

THE justification of this association is assured beyond a doubt, and I feel sure that every concern represented here will be greatly benefitted by it.

✦ ✦ ✦

IT is with a feeling of gratification that I can state, that although this association was founded in a year of depression, we are still very definitely in existence, and it is with still greater satisfaction, that I say we have steadily forged ahead through three additional years of economic stress, and in this past year, probably the worst, we have shown an increase in membership and a real display of activity and accomplishment. This fact alone is something that we may all well be proud of. It shows we have in our organization, men who have the foresight to see beyond this period of restlessness, and courage enough to battle in the face of adversity.

✦ ✦ ✦

AT this time may I take the opportunity of thanking Mr. Brown for his untiring and efficient services and also the other officers and members for their whole hearted cooperation.

✦ ✦ ✦

OUR time here together is very limited, gentlemen, so may I urge that we fill every moment of it with the discussions of our many problems, so that we may go away, feeling that again, we have made the most of an opportunity. It now gives me pleasure to introduce the Chairman of our program committee, who will also act as Chairman of this meeting—Mr. Frederick A. Westphal, Supt. of Wire Mills for the Sheffield Steel Co., Kansas City, Mo.

✦ ✦ ✦

CHAIRMAN Westphal then introduced Allen B. Dove. Mr. Dove summarized his paper on galvanizing and stood a cross-examination which developed into a general discussion on nearly all details of the process. Questions on the charcoal-wipe technique sent in by members who could not be present were adequately covered. There were discussions of insulating covers and of fluxing practice, which, it was emphasized, was simply a means of keeping a clean wire clean during the unavoidable exposure between acid and spelter. Many of the members are welding wire back of the galvanizer, some taking care to polish down and "lose" the weld, others leaving the burr and cutting out the weld after blocking the wire.

JOHN MORDICA

Supt. Rod & Wire Mill, Bethlehem Steel Company, Sparrows Point, Md. President, The Wire Association.

✦ ✦ ✦

MR. U. C. Tainton presented the first account of a new cleaning process preceding galvanizing, an electrolytic cleaning in a bath of fused salt in which metallic sodium acts to reduce iron oxide on the wire. It is possible though not economical at present to combine this cleaning with annealing.

✦ ✦ ✦

WEDNESDAY'S steel session, directed by P. W. Grassell, opened with a summary and discussion of Mr. Haskell's paper on the bright annealing of wire in electric furnaces. The matter of controlled atmospheres was the chief subject of discussion, and the conclusions reached were that the non-ferrous wires, cold rolled steel strip, and liquor finished steel wire could be very satisfactorily dealt with, but that dry-drawn steel wire, carrying a film of inorganic matter in which water is present, is a stiff problem, as yet unsolved. The author believes it will be solved by developing a new type of film. Relative cost of electric and fuel fired annealing was shown to be purely a local problem to which no general answer was ever possible.

✦ ✦ ✦

FOLLOWING the showing of an excellent new film of wire process at Youngstown Sheet and Tube Co. with running comment by F.

H. Nullmeyer, there was discussion of sull coatings for drawing, and for welding wire. The sull coat was shown to be a local problem conditioned by analysis and temperature of water, outside weather, cleaning house atmosphere, time of exposure, and other variable factors. The "acid-coat" is generally regarded with suspicion. Regarding structure induced in wire by continous drawing, nobody could be found to claim that it differed from that resulting from single drafts.

✦ ✦ ✦

AT the business meeting held in the afternoon President Mordica said:

GENTLEMEN—First, I want to express my appreciation for my re-election by the Directors as President of this Association for the 1934-35 term. I consider it a great honor and you may be sure that I am doing and will continue to do all in my power to further the objects and aims of our Association and to promote its interests.

✦ ✦ ✦

IT is interesting to know that despite the generally uncertain business conditions and changes which have existed almost since the inception of this Association, that we have shown a small but consistent and steady increase in membership each year, as well as a marked development in the value and character of the papers so ably prepared and presented by the various contributors to our annual programs. Further our financial condition has also slowly but steadily improved.

✦ ✦ ✦

AS most of you are aware, the organization and development of this Association was largely financed through its formative years by Major Richard E. Brown. The burden of the expenses incurred through these initial years has been reduced by careful management and economy from an initial deficit of over $2000 to a present deficit of only $1100.00; all this in the face of very adverse conditions. The Treasurer's report now in my hands shows the details. Right here I want to emphasize both as an expression of personal opinion and as President of the Association — the thought that Mr. Brown has done a fine job for us, not only in this, but also in his active work in organizing and developing the Association and in his assistance in securing material for programs and data for meetings.

✦ ✦ ✦

OUR meetings this year, to my mind, mark a distinct forward step. We have with us the members of the Braiding and Wire Covering Machinery Manufacturers Association, the Wire Machinery Builders Association, and the Manufacturers Committee on the Standardization of Reels and Spools. All of these organizations are doing splendid work in their respective divisions of our industry and we welcome their cooperation and participation in the work of the Wire Association.

IT is our hope that our Association will continue to broaden its work and that as time goes on these and such other organizations as relate to specific operations in the wire industry will continue to meet with us to our mutual benefit.

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BROADLY speaking and as the Constitution of our Association indicates, our purpose is "to collect and exchange information relating to the production, distribution, consumption and use of wire and wire products" and "in general, to promote the serviceability of the wire industries to the community at large."

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IT is almost common place to say that when you help the other fellow you are helping yourself—but we have found in our Association work particularly, that this is strictly true. Every time we render assistance to each other we also learn something ourselves. Since our organization is based on the idea of cooperation and mutual assistance—it is most appropriate to bring this thought before you at this time as a reminder that during the coming year we can each of us do a lot to help the other fellow with his problems if we only will do so.

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FOR the following year's thought, I am asking that you take with you from this meeting, the intent and determination to do everything you possibly can to add to our membership and to prepare and get others who are competent, to prepare the finest material available for our papers for publication during the year and for discussion at the 1935 meeting. Take the time necessary to put over the thought to others to come along with us—be one of us—and join in cooperative effort to help ourselves and others. We are all busy I know—but have you ever noticed that it is only the really busy man who ever has the time and will to add to his full day the extra bit necessary to accomplish that one extra task. It is this extra bit that we want you to do for the Association during the coming year.

E. J. P. FISHER
Winner—1934 Award.

MY feeling is that the Association has successfully fought for life during the most difficult period in our business history and now that the child appears to be able to stand without too many falls—why not let all of us give the additional touches and boosts along the road this coming year and help it to become not only bigger and stronger but finer, wiser and more valuable to the benefit of us all.

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A FEATURE of this meeting was the first presentation of the Wire Association medal, for the best technical paper of the year. This first medal, a handsome bronze plaque, went to E. J. P. Fisher, physical metallurgist of Keystone Steel and Wire Co. for his paper on the manufacture and properties of spring wire.

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In Making The Presentation Mr. Mordica Said:

AS you are undoubtedly all aware, at last year's meeting, it was unanimously voted to accept Mr. Brown's offer to supply an annual presentation medal to be awarded by the Association to the individual who, in its opinion, prepared the most meritorious paper on the art of wire manufacture or fabrication during the year.

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OF the several papers submitted—all of which possessed merit—the committee have selected the one entitled "Cold Drawn Steel Spring Wire" by Edward J. P. Fisher, Physical Metallurgist, Keystone Steel & Wire Co., Peoria, Illinois, for the award.

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THIS is a research paper in which Mr. Fisher has shown the application of certain scientific principles to the art of making quality cold drawn high-carbon steel spring wire and is to be presented and thrown open for discussion at the meeting tomorrow morning."

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MR. FISHER was then invited to the platform and Mr. Mordica made the presentation as follows: "Mr. Fisher, on behalf of The Wire Association, I hand you this tablet of award for meritorious research and achievement.

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WITH it goes our appreciation of your thought and work and the hope that the years to come will see you far forward in your chosen work. On behalf of The Wire Association, I wish you success and prosperity."

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ON Thursday, Oct. 4, the morning session, with Dr. S. A. Braley in the chair, was opened by Mr. Fisher with a very thorough summary of the subject matter of his paper and lantern slides showing photomicrographs of spring wire.

THE resulting discussion drifted rather promptly to the subject of inherent grain size as disclosed by the McQuaid-Ehn test, and its importance in forecasting proper treatment and ultimate properties of spring wire and high carbon products in general. It was clear that the members recognized the growing importance of the subject and were reluctant to leave it until it was pointed out that one of the affiliated societies was intending to devote the whole of Friday to a symposium on grain size. It was brought out that whereas until recently inherent grain size was recognizable but not controllable, it is now possible to control it within reasonable limits at the open-hearth furnace. The opinion is still held in some quarters however that inherent grain size is influenced by factors further back than the steel furnace. It is abundantly clear that members who have learned to control and interpret this new phenomenon are not yet ready to throw their cards on the table, partly because the matter is still obscure, and partly because its control may at any moment put the alert wire man in a strong competitive position. As usual with such subjects, discussions in the anti-room after the meeting were more illuminating than anything that got onto the record.

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MR. HOBBS' paper on substitutes for the lime coat, and his remarks in summary and extension of the paper were quite out of the ordinary. An author as a rule either summarizes an existing practice or presents the results of a research which is well along in its development. In either case he takes a position and defies the audience to drive him out of it. Mr. Hobbs took no such position. He merely called attention to the development which is still in its early stages, reported the rather scanty data now available, pointed out the possible gains in sight and called on the membership to pool their experiences. The discussion served to emphasize the scantiness of real information about coatings of sodium silicate and tri-sodium phosphate, and the discordance of results obtained. It appeared that their use resulted in a bright finish, generally at a sacrifice of die life, and that two or three drafts were the limit. Baking can be eliminated, but only if the coating is so thin as to make multi-draft work hazardous.

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THE conclusion was reached that these lime substitutes are bound to have a hard time breaking in. It seems probable that not only the technique of application but probably to some extent the equipment should be modified to give them a fair chance. Since the cost of lime per ton of finished wire is a fraction of a cent and other possible advantages seem in dispute it is hard to see who is going to put up the money needed for adequate research. Both the paper and the subject however were of real interest and illustrated very nicely a valuable function of such organizations as the Wire Association. If anything comes of our efforts to develop these coating materials much of the credit will be due Mr. Hobbs for his frank discussion and the Wire Association for supplying a sounding board.

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THIS meeting ran rather late and there was barely time for a cursory discussion of questions on rod de-scaling and pickling sent in by an Australian member who was unable to attend. It was the consensus that he was doing pretty well under the handicaps imposed by freight and duty charges on imported inhibitors.

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Non-Ferrous

AT the Tuesday afternoon session conducted by Paul R. Fast, papers were presented on smelting, casting and rolling of electrolytic copper by Messrs. Adams and Miller, and on drawing lubricants for copper wire, by Mr. G. W. Richards. The discussion centered around such very practical matters as materials for drawing capstan surfaces, bright finish, and die shapes, and was of the type which offers much material for thought but little for the record.

WEDNESDAY'S meeting was held jointly with the Braiding and Wire Covering Machinery Manufacturers' Association, and the three papers all concerned themselves with machine development. Chairman Anderson, some of whose off-the-record remarks will be cherished by his hearers as the bright spots of the year, held the discussion well under control in rather difficult circumstances. Under the title "What Price Speed?" some anonymous disturber, believed to have been a steel man, submitted through the Chairman some deadly logic tending to show that high speed in wire fabricating operations is either useless or worse. Some of the resulting discussion was too fast and too hot for the record, and is said to have gone on far into the night.

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ON Thursday afternoon, under the chairmanship of M. A. Kent, Mr. Horsfall's paper on the manufacture of copper in Canada was presented by Mr. Tate. In discussing Canada's future as a copper producer Mr. Tate mentioned the interesting fact that the cost of producing copper in that fortunate country is largely a matter of bookkeeping, as the precious metals recovered pay the entire cost of mining and smelting.

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THE discussion dealt largely with tinning and brought out the fact that this operation is so simple as compared to other coating methods, particularly those applied to steel, that such matters as speed, length of immersion, etc. are largely matters of commerce, conditioned by factors quite unconnected with the metallurgy of the process. The limits are so broad that it is hardly possible to get outside them. Losses by dross, leakage, accident, contamination, etc., so far outweigh the tin actually carried out on the wire that savings are sought chiefly in direct labor cost.

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Among Those Registering For Attendance At The Technical Sessions Were The Following:

Akin, W. H., Asst. to Pres.
Laclede Steel Co.,
St. Louis, Mo.

(Please turn to page 426)

Registry of Used Wire Machinery

We Offer—Subject to Prior Sale—The Following Used Wire Mill Machinery

No. 237
Electric Resistance Pointers, Capacity .148

No. 282
Waterbury No. 1 Straight Roll Machines, With Spooling Attachment.

No. 302
9 Die Richards Continuous Machine For Copper Rod

Waterbury stand spooler for fine wire.

No. 321
Electric Platform Truck
Capacity 6000 lbs.
Platform 41″ x 82″ x 22½″ High
24 Cells Edison A-6 Batteries

No. 342
Nilson Power Press B 2

No. 348
Five-block rod bench with gear drive and motor, 26″ and 22″ blocks.

No. 400
Twenty head enameling machine complete, capacity down to .001.

No. 401
Eight head spooler, capacity 200 lb. spools, motor driven.

No. 402
Hayes electric furnaces, automatic control, with 32 head spooler, for fine wire.

No. 403
Waterbury straight roll fine wire machines, motor and belt drive.

No. 406
Die Reaming Lathe, Semi-automatic.

No. 408
Barron and Crowther 3 hole continuous wire machines, ranges from No. 5 rod to 21 gauge.

No. 409
Wire pointers for bench or post mounting, ¼ to No. 12.

No. 418
Five 4-penny nail machines (German design)

No. 432
24 block intermediate frame with 16″ blocks, reducer, and pulley drive.

No. 438
12 block fifteen frame without drive.

WE HAVE BUYERS FOR THE FOLLOWING

No. 360
Wanted
No. 1 Tor and No. 1 Universal and No. 3 Universal Sleeper & Hartley Coilers.

No. 382
Rivet Machines No. 0 or No. 1 Waterbury or Manville.

No. 384
Florist Wire Machines.

No. 411
A 5-keg nail tumbler.

No. 412
Tensile testing machine for low carbon wires No. 5 to No. 25 gauge.

No. 413
U. S. S. M. Power Eyeletting machines, type B.

No. 414
Two take-ups. 60″ reel by 32″ traverse, with jacks, and chain drive from capstan shaft, also two let-off stands, and 36 x 8 capstans with spur drive.

No. 415
Paper wrapping machine, coils 16″ to 22″, 100 lb. weight, Terkelsen 1C or equivalent.

No. 416
Small riveting machines, Townsend No. 1 or equivalent.

No. 419
Single spooler, 6½ x 6½ for No. 20 hard basic.

No. 420
4 block rod bench, 22″ or 24″.

No. 423
Automatic roll feed for press, 2″ stroke, stock 3″ x 1/16″.

No. 425
Lewis-Shepard lift trucks, about 45 x 20, height 6″.

No. 426
Loom for brass, copper and bronze, 100 mesh.

No. 427
2¼″ x 6″ c. r. mills with take-ups.

No. 429
Rod and wire trucks.

No. 430
Double stroke cold headers, Waterbury or Manville No. 0, up to 3/16 wire 1″ blank.

No. 433
Electric butt welder, 8 to 16 ga.

No. 434
Electric spot welder for wire and light sheets.

No. 435
Nail machine (roofing) ⅝″ head on 12 ga.

No. 436
Flattening mill for .10 x .014 stapling.

No. 437
Tensile testing machine for .090 music wire.

No. 439
Rivet machine for #7 ga. wire. Speed not important.

Dunscomb Associates

BOX 320, C/O WIRE AND WIRE PRODUCTS — 17 EAST 42nd ST., NEW YORK, N. Y.

REGISTRY OF USED WIRE MILL MACHINERY

New Reel And Spool Standards

For Insulated Wire Manufacturers

✦ ◆ ✦

Final Report of Manufacturers' Committee on Reel and Spool Proportions—with Tables of Sizes adopted and Recommended to the industry—Sizes reduced from 1000 to .32 in number.

✦ ◆ ✦

Personnel of Manufacturers' Committee

Frank Mossberg, President — **E. W. Clark, Vice Chairman and Secretary**

WIRE GROUP

E. W. Clark, Mech Eng.
General Electric Co.,
Schenectady, N. Y.

W. A. Vincent, Plant Eng.
General Cable Corp.,
Perth Amboy, N. J.

E. F. Gould, Prod. Supt.
Anaconda Wire & Cable Co.,
Hastings-on-Hudson, N. Y.

R. E. Bassett,
American Brass Co.,
Waterbury, Conn.

WIRE MACH. GROUP

W. D. Pierson,
Waterbury Farrel Fdry. & Mach. Co.,
Waterbury, Conn.

J. P. Barclay, Pres.
Wire Mach. Corp. of America,
New Haven, Conn.

L. A. Vaughn, Pres.
Vaughn Mach. Co.,
Cuyahoga Falls, O.

R. W. Withington, Pres.
Amer. Ins. Mach. Co.,
Philadelphia, Pa.

SPOOL & REEL GROUP

R. B. Hayward, Pres.
R. B. Hayward Co.,
Chicago, Ill.

E. J. Hubbard, Pres.
Hubbard Spool Co.,
Chicago, Ill.

Frank Mossberg, Pres.
Mossberg Pressed Steel Corp.,
Attleboro, Mass.

Foreword

THE movement for simplification and standardization of Spools and Reels was started through the Division of Simplified Practice of the Dept. of Commerce. The first meeting was held in March 1927. Several meetings were subsequently held both in New York and Washington and a committee was appointed as a result of this from the various manufacturers.

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THIS can be more readily understood when it is realized that there were over 1000 different sizes of Reels and Spools in use for the purpose of handling wire.

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THE material submitted in this report is not to be considered as a national standard at this time, but rather as a means which will permit the formation of a national standard in the near future.

✦ ✦ ✦

SOME progress was made, but it was found that the principal problems confronting the committee were very difficult because it was necessary to harmonize with the various manufacturers in regard to dimensions and requirements.

Report of Manufacturers' Committee

THE Tabulations of Reel and Spool Proportions Submitted Herewith Are Suggested by a Representative Group Within the Wire Industry for the Purpose of Co-relating the Design of Producing Machinery and Wire Handling Equipment.

Manufacturers Proposal for Proportions of Reels and Spools

HEREWITH are submitted descriptions and listings of the new standards for Reels and Spools and other pertinent data.

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THESE are submitted to the Wire Industry for consideration, the essential purpose being to correlate and unify the major portion of future design of wire-making and handling equipment.

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THE early portion of the investigation was started independ-

ently, about 1929 by several separate organizations, who soon joined together and pooled their experience. This work was then brought to the attention of the Department of Commerce Simplified Practice, in the hope that the facilities they could offer might be of use in making the investigation still more broad and representative. This hope has been realized in a large measure, until at the present time this group of manufacturers is felt to be largely representative of the industry as a whole

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DUE to the active interest which has been brought to bear on the problem, the original recommendations of the individual companies have been considerably modified and refined. It is now thought that this material is sufficiently well formed to be placed in the hands of all concerns interested, as a means which will permit the formation of a National Standard in the future.

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THIS material has been placed before several sponsor bodies for the industry. No complete approval has been given on the whole, but several portions have been given either approval or approval in principle, by some division of the sponsor bodies. Where no comment is available, it is evident that this has not been forthcomoing because of the tremendous stocks of spool equipment now on hand.

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THIS series of listings, then, is the composite result of a study of:

(1) EXISTING practice in many district manufacturing plants.

(2) THE experience of spool manufacturers and others familiar with the trade.

(3) QUESTIONAIRES answered by representative individuals within the various manufacturing plants.

(4) GENERAL methods in use in standardization by other industries.

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IN presenting this material, it is thought that the following points should be stressed, so that any scrutiny may be based upon the same outline as guided the manufacturers' committee in evolving its proposal:

(1) THE proposal should be so well-proportioned that it may eventually be adopted by all industries using such equipment, without the addition of a disproportionate number of special sizes extraneous to the tabulation.

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(2) THE series of proportions should be ideal, from the standpoint of suitability and economy, and should not be compromised by present equipment and practice where these might tend to depreciate the ultimate value of such a proposal.

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(3) TO install such an ideal system, either one of three courses must be pursued:

(a) Immediately scrap and install new equipment.

(b) Rebuild all present equipment to conform to the new proposal.

(c) Replace worn-out equipment as necessary with new machines, adapted to the proposal.

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IN the opinion of many, Method (C) is preferable, because it involves no major expenditures and only necessitates an inconvenient transition period when both classes of material, old and new, will be in the shop at the same time. Special cases may be investigated to determine whether rebuilding to the new proposal can justify the expense involved.

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(4) THIS proposal, if adopted, should not be enforced arbitrarily. It cannot be made so broad that it can fit every conceivable case ideally. Therefore, whenever the proposal can be followed, it should be used. Whenever it can be shown that the prime requisites of suitability and economy can be better served by a departure from the proposal, this should be done. In other words, this proposal is offered as a guide and not as a law.

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(5) SHIPPING and process spools should be of essentially the same proportions and should have the same installation dimensions wherever practical.

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(6) REEL and spool proportions should be the basis for machine design, rather than the corollary proposition, machine standardization the basis for spool and reel design. This should not be construed as meaning that machine design cannot and should not be standardized, but rather that machine standardization is more easily attainable when there is a spool or reel around which to build.

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IN the following discussion by groups, reference is made in a number of instances to an "ideal" progression by volumes, weights or dimensions. This ideal series, which has influenced the selection of sizes and capacities appended herewith, is the result of a study of the proportions of a very large number of reels and spools at present in practical use. The volumes of weight-carrying capacities of these were graphed, and, as was to be expected, it was discovered that they all struck close around a general average whose curve was a geometric progression.

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Discussion of Group 1-A

ON this particular grouping of spools, it is considered particularly desirable that they retain the same proportions in both process and shipping types, and that any distinction between the two be made in the constructional details and tare weights. However, since the present stocks of shipping spools of these sizes are so great as to make it unlikely that any purchases will be required within the next five years, it has been suggested that this tabulation for the time being be considered as applying principally to process or shop spools.

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IT is fortunate that the present stocks of shipping spools do not depart to any degree from the dimensions proposed and it is moreover evident that the greater por-

MANUFACTURERS PROPOSAL

PROPORTIONS OF REELS & SPOOLS

SMALL SPOOLS GROUP 1A

X205
S1

CLASS NO	S-1	S-2	S-3	S-5	S-10
FLANGE	2 1/2"	3"	3 1/2"	4 1/2	6"
TRAVERSE	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2
BARREL	1 3/4	1 3/4	2	2 1/2	3 1/2

THE BORE HOLE SHALL BE A FREE FIT ON A 5/8" DIA. SPINDLE.
THE OVERALL LENGTH SHALL NOT EXCEED A MAXIMUM LIMIT OF 4"

The proposed tabulation does not define design or construction but suggests primarily a minimum installation space requirement as determined by flange diameter and maximum overall length.

The following table shows approximate capacities of various classes of material and is not to be construed as a standard for shipping weights.

	CAPACITY IN POUNDS, RANDOM WOUND IN PROTECTED VOLUME AND IN FULL VOLUME (PROT VOL / FULL VOL)						
CLASS NO.	BARE CU. .22*	BARE FE. .192	*40 ENAM. .178	*36 ENAM. .186	*22 ENAM. .192	*36 D.S.C. *26 S.C.E. .086	20 S.C.E. .126
S-1	1.21 / 1.92	1.05 / 1.68	.96 / 1.53				
S-2	2.50 / 3.58	2.19 / 3.13	2.00 / 2.86				
S-3	3.48 / 5.13	3.03 / 4.47	2.75 / 4.08	2.94 / 4.33		1.34 / 1.95	
S-5	6.20 / 8.35	5.41 / 7.29		5.25 / 7.06	5.40 / 7.30	2.40 / 3.23	3.55 / 4.77
S-10	10.9 / 14.3	9.50 / 12.50		9.20 / 12.10	9.5 / 12.5	4.20 / 5.35	6.25 / 8.20

***These figures are density in pounds per cubic inch used in calculating capacity.**

tion of this present stock can be easily adopted to any machine which provides the minimum space requirements for the new spool proportions in the proposal.

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THE increase in the traverse length to the new figure of 3½" permits a considerable increase in barrel diameter, without influencing the accustomed volumetric capacity of the spools. This increase in barrel is of considerable advantage, as it affects to advantage the spooling characteristics and thickness of wire layer very materially.

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IN general, it may be said that the traverse length is unimportant to the secondary processor, who must unwind the wire from a spool. It has been determined, moreover, that the majority of spooling equipment at present installed is equipped with traverse mechanisms whose stroke may be varied or else may be altered to the new dimension with little difficulty or expense.

Intermediate Metal Spools Group II A

X205
S2

CLASS NO.	S-15	S-30	S-60	S-90	S-175	S-200	S-120	S-240	S-450	S-500
FLANGE	6	8	12	12	16	18	12	16	22	22
TRAVERSE	6	6	6	8½	8½	8½	11	11	11	11
BARREL	3½	4½	7	7	8½	11	7	8½	11	9
MAX. O.A.L.	6¾	6¾	6¾	10	10	10	12½	12½	12½	12½

The proposed tabulation does not define design or construction but suggests primarily a minimum installation space requirement as determined by flange diameter and maximum overall length. See sheet X205-S3 for approximate capacities.

Intermediate Composite Reels Group II B

CLASS NO.	R-1	R-2	R-3	R-4	R-5
FLANGE	12	16	20	24	24
TRAVERSE	6	6	8½	8½	12
BARREL	6	8	12	14	14
MAX.O.AL.	8½	9	12	12	15½
THE BORE HOLE SHALL BE A FREE FIT ON 1½ DIAMETER ARBOR.					

The proposed tabulation does not define design or construction but suggests primarily a minimum installation space requirement as determined by flange diameter and maximum overall length. See sheet X205-S-4 for approximate capacities.

Discussion Group II-A

IN this group it was found impractical to make the process and shipping spools essentially identical. These spools, however, are largely used in wire drawing, annealing and stranding and, since these services are so severe in their requirements, it was felt best to fit the spools as closely as possible to the job.

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THE best proportions for wire drawing and annealing are somewhat antagonistic to the proportions best adapted for stranding. For this reason, the general shape of the spool changes from the small end to the large end of the list. Where the spool is small and the wire is relatively fine, the traverse has been kept long and the filling thin. In the large spools, attempt has been made to approach the ideal strander shape, whose flange is 2, whose barrel and traverse are 1. Three traverses have been used and the spools grouped by capacity around these, so that component spooling equipment can be quite simple. The above also includes sizes of spools S-15, S-30, S-60 on table 2-A.

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THE group on the 11″ traverse in II A is recommended as the basis for design for stranding equipment in general in the 500# class. Present patterns for strander spiders, with minor alteration, can be adapted to swing the 22″ flange diameter. The full volumes are somewhat in excess of those required for bare copper stranding in 500# units, or subdivisions thereof, but handle lengths in insulated strand for control cables and telephone work to good advantage.

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S90 and S175, on the 8½″ traverse, may be considered as the design basis for small stranding equipment in 250# units of bare copper. Insulated strand is seldom used in this range and the extra volume beyond that needed for bare strand has not been added.

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S200 has been included particularly for the take-up behind the flat wire rolling machines, to permit of proper ventilation during anneal and to prevent kinking and waviness when despooling.

✦ ✦ ✦

S500 may be considered a special case of S450. It has been in-

Approximate Capacities of Group II A

X205
S3

THIS TABULATION IS NOT TO BE CONSTRUED AS A STANDARD FOR SHIPPING WEIGHTS.

CLASS NUMBER	FULL VOLUME CU. IN.	PROTECTED VOLUME	RATIO F.V./P.V.	DEPTH OF PROTECTION	PROTECTED DIAM.	COMPENSATION RATIO	CAPACITY IN POUNDS RANDOM WOUND (PROT. VOL. / FULL VOL.) BARE CU. *.22	BARE IRON .192	LENGTH OF WIRE, RANDOM WOUND IN FEET, BY DIAMETER OF WIRE IN INCHES, FOR FULL AND PROTECTED VOLUME. (PROT. VOL. / FULL VOL.) † 19.3' .060	† 10.85' .080	† 6.94' .100	† 4.82' .120	† 2.71' .160	† 1.74' .200 FT. DIA.
S-15	112	75	1.50	.35	5.3	1.51	16 / 24	14.5 / 21.5	1450 / 2160					
S-30	206	150	1.37	.40	7.20	1.60	32 / 45	29 / 39.6	2900 / 4000	1630 / 2240				
S-60	447	300	1.49	.68	10.62	1.52	64 / 97	58 / 86	5800 / 8600	3260 / 4850	2080 / 3100			
S-90	634	568	1.12	.20	11.6	1.66	125 / 140	109 / 122	10950 / 12250	6160 / 6880	3940 / 4400	2740 / 3050		
S-175	1230	1135	1.08	.20	15.6	1.84	250 / 268	218 / 234	21900 / 23700	12300 / 13350	7870 / 8550	5480 / 5930	3070 / 3330	1975 / 2140
S-200	1360	1135	1.20	.50	17.0	1.54	250 / 300	218 / 261	RECOMMENDED FOR THE ANNEALING OF SQUARE AND RECTANGULAR SECTIONS					
S-120	820	600	1.37	.60	10.8	1.54	125 / 180	115 / 157	11500 / 15800	6500 / 8900	4170 / 5700	2890 / 3950	1625 / 2220	
S-240	1650	1200	1.37	.75	14.5	1.71	250 / 360	230 / 317	23000 / 31800	13000 / 17900	8300 / 11500	5770 / 7950	3250 / 4470	2080 / 2870
S-450	3130	2400	1.31	1.00	20.0	1.82	500 / 675	460 / 600		26000 / 34000	16700 / 21700	11500 / 15000	6500 / 8500	4170 / 5750
S-500	3500	3180	1.11	.40	21.2	2.36	700 / 770	610 / 672			22100 / 24300	15300 / 16850	8600 / 9500	5530 / 6100

*Pounds capacity of bare wire figured thus: { Copper density=.22 pounds per cu. in. / Iron density=.192 pounds per cu. in.

†The volume of one cubic inch is equal to .0833 square inches by one foot long. Dividing .0833 by the diameter of wire squared will give the lineal feet per cubic inch of reel capacity for layer wound. Random winding=85% of layer winding.

troduced for the stranding of very long lengths of bare wire, whose diameter is such that the compensation ratio of 2.36 is permissible.

✦ ✦ ✦

SINCE the use of Spool S450 has been questioned when applied to existing Larmuth stranding equipment, we are attaching a sketch worked out in sufficient detail to show that it is possible to adapt present equipment to this new spool without disturbing the main elements of the machine. This has been accomplished by moving the spool to the machine center and by adding a bob weight to the cradle to prevent its rotating with the flyer tube. See illustration X200-D11.

✦ ✦ ✦

CONSIDERATION has also been given to a spool particularly adapted to the aluminum industry. This spool has a flange diameter of 20", traverse of 8¾", a bar diameter of 10" and an overall length of 11½". These proportions will hold the wire from a standard wire bar of 115 to 120 lbs. of aluminum.

✦ ✦ ✦

Discussion Group 2-B

THE reels in this group are essentially shipping reels and adapted for process use in finishing operations prior to shipping.

✦ ✦ ✦

THESE proportions, with one exception, have been in general use in the industry for some time past. The exception, R-4 and R-5, supplants a reel now in general use, whose flange is 24", whose traverse is 6", and whose barrel is 14". The volume and capacities of the present reel have been retained in the proposed. The old reel is considered of poor proportions from the standpoint of tare weight and strength. Four-fifths of its tare is in the flanges alone. This reel is used generally as the take-up be-

Approximate Capacities of Group II B

X205
S4

THIS TABULATION IS NOT TO BE CONSTRUED AS A STANDARD FOR SHIPPING WEIGHTS.

CLASS NUMBER	VOLUME IN CUBIC INCHES			CAPACITY OF REEL IN POUNDS AND LINEAL FEET RANDOM WOUND IN PROTECTED AND FULL VOLUME (FEET / POUNDS — PROT. / FULL)									
	FULL	PROT.	RATIO	BARE CU. .22	BARE FE. .192	NO.15SCE. .16	No6 T.B.W.P. .081	No6 RSSD. .074	No6 RDDB. .062	No.10 R.C. .064	No.14 R.C. .050	No.18 R.C. .058
R-1	510	300	1.7	66 / 112	58 / 98	48 / 81						
R-2	905	600	1.5	132 / 200	115 / 173	96 / 145				775' 28 58 1200'	1170' 30 45 1750'	3820' 35 52 5680'
R-3	1710	1200	1.4	264 / 375	230 / 329	192 / 274				1560' 77 109 2220'	2340' 60 86 3350'	7650' 70 99 10800'
R-4	2550	2000	1.3	440 / 560	384 / 490		162 / 207	1220' 148 189 1560'	985' 124 158 1250'	2600' 128 163 3320'	3900' 109 127 4950'	
R-5	3600	2800	1.3	615 / 790	537 / 690		227 / 292	1710' 207 266 2200'	1370' 173 223 1770'	3640' 179 230 4670'	5450' 142 180 7000'	

CALCULATIONS FOR RANDOM WOUND BASED ON—

Item	Density In Pounds Per Cu. In.	Pounds Per 1000 Ft.
Bare Round Copper	.220	
Bare Round Iron	.192	
No. 6 Solid T.B.W.P.	.081	
No. 6 Stranded 4/64" S.B.	.074	121.
No. 6 Stranded 4/64" D.B.	.062	126.
No. 10 Solid 3/64" S.B.	.064	49.2
No. 14 Solid 3/64" S.B.	.050	25.7
No. 18 Solid 1/64" S.B.	.058	9.16

Calculations For Layer Wound Based On—Above Figures Multiplied By $\frac{100}{85}=1.18$

hind fabric or textile insulating machines for rectangular wire, which is generally spooled "laid up" and requires the operator's attention at each turn of the traverse. By increasing the traverse from 6 to 8½", the amount of attention necessary will be reduced in proportion.

+ + +

IT is to be noted that this group is now termed "reels" whereas in previous reports it was termed "spools". This is due to the fact that if a package of these sizes is shipped as "spools," it is possible that the shipment may be given an unfavorable freight classification.

Discussion Group 3

THE basis for this selection is the standardization of power cable reels originally proposed by the IPCEA and now in general use.

+ + +

THE IPCEA standardization is shown as a part of Group 3, following the item "Current IPCEA Standard" and designated by the letters A, B, C, D, E, F, G and a tentative proposal H.

+ + +

THIS series was primarily designed for the purpose of shipping power cable, but the proportions have proven so satisfactory in service that they have been used for other classes of bulky material as well. The manufacturers' committee has felt, however, from their later survey, that it would be desirable to add several sizes to the original list, in order to comply with present practice in a number of the large corporations. Hence, the following reels are recommended as an addition to make up the complete Group 3:

+ + +

R8 and R14

THE protected volumes of these two reels have been found very desirable in the past for the

Large Reels Group III

X205
S5

CLASS NO	R-8	R-14	R-21	R35	R-46	R-68	R-93	R-111	R-116	R153	R159	R210
FLANGE	30	36	36	42	48	54	60	66	72	78	84	84
TRAVERSE	12	12	18	24	24	32	32	36	36	36	36	48
BARREL	16	16	16	24	24	32	32	40	48	48	56	56
MAX. O.A.L.	18	18	27	33	33	41	41	45	45	46½	46½	58½
CURRENT IPCEA STANDARD			A		B		C	D	E	F	G	H

The proposed tabulation does not define or limit design, construction or tare weight nor does it attempt to suggest service application.

The following table shows approximate capacities of various classes of material and is not to be construed as a standard for shipping weights.

CLASS NO.	VOLUME IN CUBIC INCHES FULL	VOLUME IN CUBIC INCHES PROT.	DEPTH OF PROTECTION	CAPACITY IN LINEAL FEET BY DIAMETERS LAYER WOUND IN PROTECTED VOLUME. .32"	.40"	.50"	.64"	.80"	1.00"
R-8	6060	4950	1 IN.	3770	2400	1530	1000	600	
R-14	9800	8500	1	6470	4125	2630	1725	1030	
R-21	14700	12750	1	1.00"	1.25"	3950	2590	1540	
R35	24200	16300	2	1265	800	1.60"	2.00"	1970	1265
R-46	32500	25600	2	1980	1270			2.50"	3.20"
R-68	47550	32181	3	2494	1599	972			
R93	64800	47800	3	3700	2375	1440			
R-111	77800	56700	3	4400	2820	1710	1100		
R-116	81500	58000	3	4500	2880	1750	1125	720	
R153	107000	81500	3	6320	4050	2460	1580	1000	
R159	111000	74700	4 IN.	5800	3700	2250	1450	925	565
R210	148000	100,000	4		4970	3020	1940	1240	758

DIAMETER OF WIRE OR CABLE IN INCHES

processing of weatherproof and rubber covered, and have also been used to a considerable extent for shipping. The dimensions, insofar as practical, have been chosen to be consistent with those recommended by the IPCEA.

\+ + +

R35

THIS reel has found a great deal of use in the past for the processing of all sizes of weatherproof and the shipping of the coarser sections. It also has been used for power cable, in the shipment of short lengths of the class of material which would ordinarily be carried by the "B" reel. Investigation discloses that there is sufficient miscellaneous shipment of this sort to make a worthwhile saving by the reduced tare weight which this reel offers over R46.

R68

R68 has been suggested to the manufacturers' committee by representatives of the IPCEA, as a volume midway between the original "B" and "C" reels. As will be noted from Group 3, the rate of volume increase is 100% between these two points on the prior standard. While this has not as yet worked any particular hard-

Summary Groups I-II-III

X205

S6

This tabulation is for the purpose of illustrating the proposal and is not to be construed as defining service application.

CLASS NUMBER	F	T	B	MAX O.A.L	ARBOR	FULL VOLUME CU. IN.	USUAL SERVICE APPLICATION	PROCES	SHIPPIN
S-1	2½	3½	1¾	4	5/8	8.7	BARE AND MAGNET WIRE.	✓	✓
S-2	3	3½	1¾	4	5/8	16.3	DRAWING AND ANNEALING.	✓	✓
S-3	3½	3½	2	4	5/8	23.3	PAYOFF TO COIL WINDERS,	✓	✓
S-5	4½	3½	2½	4	5/8	38.0	ASBESTOS BRAKE LINING SPINNERS ETC.	✓	✓
S-10	6	3½	3½	4	5/8	65.0		✓	✓
S-15	6	6	3½	6¾		112.	DRAWING, ANNEALING AND STRANDING.	✓	
S-30	8	6	4½	6¾		206.	PAYOFF TO BUNCHERS, ENAMELING OVENS,	✓	
S-60	12	6	7	6¾		447.	FABRIC INSULATORS AND TINNERS	✓	
S-90	12	8½	7	10		634.	RECOMMENDED FOR REPLACEMENT IN EXIST-	✓	
S-175	16	8½	8½	10		1230.	ING STRANDING EQUIP. TOO SMALL FOR R120+240	✓	
S-200	18	8½	11	10		1,360.	ANNEALING OF SQUARE + FLAT ROLLED		
S-120	12	11	7	12½		820.	DRAWING, ANNEALING + STRANDING	✓	
S-240	16	11	8½	12½		1,650.	TELEPHONE + CONTROL CABLE INSUL. + STRANDING	✓	
S-450	22	11	11	12½		3,130.	PAYOFF TO TINNERS, INSULATORS + BRAIDERS	✓	
S-500	22	11	9	12½		3,500.	SPECIAL FOR LONG BARE STRANDING	✓	
R-1	12	6	6	8½	1½	510.	MAGNET WIRE	✓	✓
R-2	16	6	8	9	1½	905.	MAGNET, TINNED + BARE WIRE.	✓	✓
R-3	20	8½	12	12	1½	1,710.	MAGNET, TINNED + BARE WIRE.	✓	✓
R-4	24	8½	14	12	1½	2,550.	MAGNET, AND SMALL RUBBER COVERED.	✓	✓
R-5	24	12	14	15½	1½	3,600.	SMALL RUBBER COVERED + WEATHERPROOF	✓	✓
R-8	30	12	16	18		6,060.	RUBBER COVERED + WEATHERPROOF	✓	✓
R-14	36	12	16	18		9,800.	RUBBER COVERED + WEATHERPROOF	✓	✓
R-21	36	18	16	27		14,700.	* I.P.C.E.A. "A" INSULATED POWER CABLE	✓	✓
R-35	42	24	24	33		24,200.	WEATHERPROOF + MISC. INSULATED CABLE	✓	✓
R-46	48	24	24	33		32,500	* I.P.C.E.A. "B" INSULATED POWER CABLE	✓	✓
R-68	54	32	32	41		47,550	* I.P.C.E.A. TENTATIVE PROPOSAL FOR INSUL. POWER CABLE	✓	✓
R-93	60	32	32	41		64,800	* I.P.C.E.A. "C" INSULATED POWER CABLE	✓	✓
R-111	66	36	40	45		77,800	* I.P.C.E.A. "D" INSULATED POWER CABLE	✓	✓
R-116	72	36	48	45		81,500	* I.P.C.E.A. "E" INSULATED POWER CABLE	✓	✓
R-153	78	36	48	46½		107,000	* I.P.C.E.A. "F" INSULATED POWER CABLE	✓	✓
R-159	84	36	56	46½		111,000	* I.P.C.E.A. "G" INSULATED POWER CABLE	✓	✓
R-210	84	48	56	58½		148,000	* I.P.C.E.A. "H" INSULATED POWER CABLE	✓	✓

Manufacturers Proposal

FINAL STANDARDIZED SIZES

REEL and SPOOL PROPORTIONS

Class Number	Size	Dia. Arbor	Dia. Center Hole		Dia. Dog Pin	Dia. of Dog Hole	Rad. of Dog Hole
S-1	2½ × 3½ × 1¾	5/8	41/64		1/4	5/16	5/8
S-2	3 × 3½ × 1¾	"	"		"	"	"
S-3	3½ × 3½ × 2	"	"		"	"	"
S-5	4½ × 3½ × 2½	"	"		"	"	1"
S-10	6 × 3½ × 3½	3/4	49/64		"	"	"
S-15	6 × 6 × 3½	"	"		"	"	"
S-30	8 × 6 × 4½	"	"		3/8	7/16	1 7/8
S-60	12 × 6 × 7	1 1/8	1 17/32		"	"	"
S-90	12 × 8½ × 7	"	"		"	"	"
S-175	16 × 8½ × 8½	"	"		3/8	11/16	3½
S-200	18 × 8½ × 11	"	"		"	"	"
S-120	12 × 11 × 7	"	"		3/8	7/16	1 7/8
S-240	16 × 11 × 8½	"	"		5/8	11/16	3½
S-450	22 × 11 × 11	"	"		"	"	"
S-500	22 × 11 × 9	"	"		"	"	"
R-1	12 × 6 × 6	"	"		3/8	7/16	1 7/8
R-2	16 × 6 × 8	"	"		5/8	11/16	3½
R-3	20 × 8½ × 12	"	"		5/8	11/16	3½
R-4	24 × 8½ × 14	"	"		"	"	"
R-5	24 × 12 × 14	"	"		"	"	"
R-8	30 × 12 × 16	1 7/8	1 61/64		3/4	7/8	6
R-14	36 × 12 × 16	"	"		"	"	"
R-21	36 × 18 × 16	"	"		"	"	"
R-35	42 × 24 × 24						
R-46	48 × 24 × 24						
R-68	54 × 32 × 32						
R-93	60 × 32 × 32						
R-111	66 × 36 × 40						
R-116	72 × 36 × 48						
R-153	78 × 36 × 48						
R-158	84 × 36 × 56						

ship, there seems to be a feeling that this gap should be reduced in extent by the inclusion of an intermediate reel. This matter is now under consideration by the IPCEA. It will be noted that the addition of this volume requires no new flange or barrel.

✦ ✦ ✦

IT will be noted that arbor diameters have not been specified as a part of the Group 3, although the IPCEA standard specification is definite in this regard. The manufacturers' committee originally recommended a deviation in part from the IPCEA recommendations, but has withdrawn its list until such time as it will be possible to get a definite opinion from the majority of interested users. This matter is under investigation at the present time, and it will be reported later.

✦ ✦ ✦

THE added reels are not approved by IPCEA for power cable shipment, although such shipments are occasionally made on these reels, where an agreement between producer and user already exists.

✦ ✦ ✦

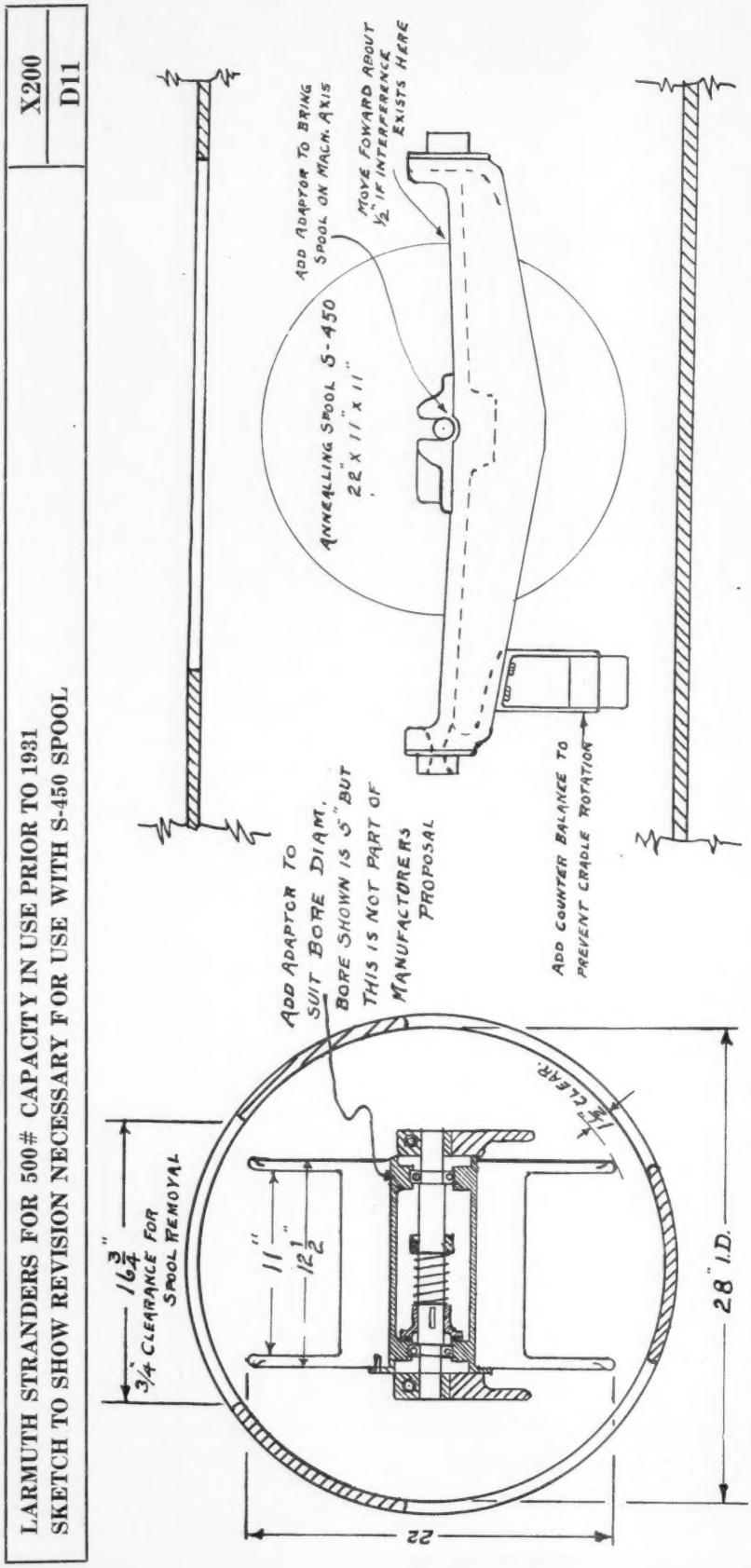
IN this group, as in the other groups, the class or designation number is of such form that interpolations of spools and reels may be made in the future without interrupting the series. In Group 3, the number following the letter "R", when multiplied by 700, approximates the full volume of the reel in cubic inches. In the case of Groups 1-A and 2-A, the designation number following the letter "S", multiplied by 7, gives approximately the cubic inches of full volume.

✦ ✦ ✦

AN attempt has been made to standardize trolley reel proportions, bringing the individual dimensions into consistent relation with the dimensions of reels in Group 3. There has been considerable objection to any change in present published proportions, by the sponsor organization, and, since so little interest has been evinced in this group, it has been considered advisable to drop this proposal until a more propitious time.

✦ ✦ ✦

THE manufacturers' committee does not consider it possible at this time to specify anything definite on construction, on any of the groups. However, the dimensions proposed have been consider-


X200
D11
LARMUTH STRANDERS FOR 500# CAPACITY IN USE PRIOR TO 1931
SKETCH TO SHOW REVISION NECESSARY FOR USE WITH S-450 SPOOL
ADD ADAPTOR TO BRING SPOOL ON MACH. AXIS
MOVE FOWARD ABOUT ½" IF INTERFERENCE EXISTS HERE
ANNEALLING SPOOL S-450
22" X 11" X 11"
ADD ADAPTOR TO SUIT BORE DIAM.
BORE SHOWN IS 5" BUT THIS IS NOT PART OF MANUFACTURERS PROPOSAL
ADD COUNTER BALANCE TO PREVENT CRADLE ROTATION
1¾" CLEAR
16¾"
¾" CLEARANCE FOR SPOOL REMOVAL
11"
12½"
28" I.D.
22"

ed in the light of the usual designs now in vogue, and it is felt that new constructions will not have to be developed to build within the proposed dimensions. It is thought best that no effort be made toward the specification of construction until the proportions are generally adopted. A survey at a future date may indicate the possibility for a further proposal in this regard.

✦ ✦ ✦

THE attached listings total 32 spools and reels, which the manufacturers' committee believe are adequate for the processing and shipping of practically all classes of material. The number of reels and spools of different proportions now in general use has not been determined, but it is known that, within individual corporations, as many as 450 separate types are now current. It could be reasonably assumed, therefore, that the simplification is in the ratio of 1000 to 32.

✦ ✦ ✦

Note: I. P. C. E. A. is Insulated Power Cable Engineers Association. This is an independent organization composed of representatives from practically all the large cable manufacturers. It is the technical advisory group to NEMA on power cable specifications and application.

By Arrangement With The Manufacturers' Committee of Reels And Spools Standards

✦ ✦ ✦

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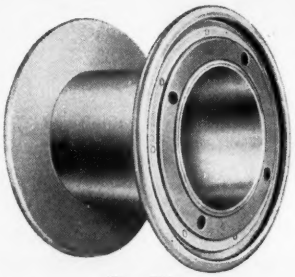

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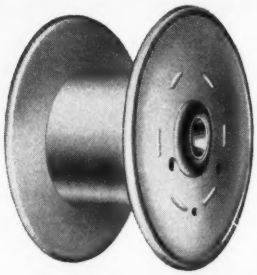

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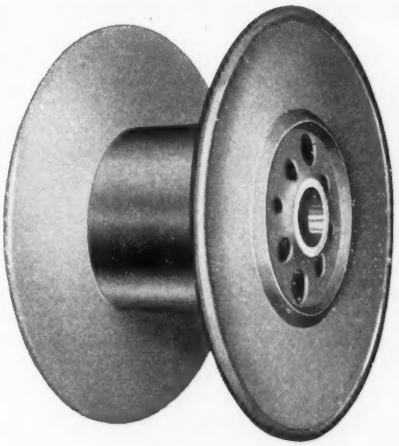

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A Noted Wire Man Passes

Frank H. Nullmeyer, Superintendent, Rod, Wire and Conduit, Youngstown Sheet and Tube Company, Passes Away

A SELF-EDUCATED man, who became a recognized authority, in the steel wire industry, an inventor of note, a tireless worker, and an exacting but just "boss," died October 20, 1934.

✦ ✦ ✦

HE was **Frank H. Nullmeyer,** for more than 25 years superintendent of the rod and wire plant of Youngstown Sheet & Tube Co. at Struthers, Ohio.

✦ ✦ ✦

MR. NULLMEYER was truly an "architect of his own fortunes." He started his career as a young boy, entirely on his own. There were no favoring circumstances; he had but a limited primary education. A will to succeed and unquenchable thirst for learning brought the once plumber's apprentice to high position and to fame in his life's ultimate vocation.

✦ ✦ ✦

AFTER spending his usual time in the mill Saturday morning and conferring with associates early Saturday evening, he began complaining of a headache. It was not thought serious. Later Mrs. Nullmeyer called Francis, a son, who lives but a few blocks away, and he secured some headache tablets. About 11:30 p. m. a hastily called physician found Mr. Nullmeyer dead. Death was caused by a cerebral hemorrhage.

✦ ✦ ✦

MR. NULLMEYER was one of the best known authorities in the steel wire industry. He worked on innovation all the time. His most recent and most important invention, the Nullmeyer wire drawing block, which increases production and eliminates much hand labor, has been completely installed in the Sheet & Tube plant here, and is being purchased by other steel wire makers.

FRANK H. NULLMEYER

✦ ✦ ✦

MR. NULLMEYER was an accomplished writer on technical subjects and a lecturer on steel manufacturing methods. Hardly more than two weeks ago he read a paper before the Wire Association of the American Metal Congress at New York. Last summer the magazine "Steel" published a series of articles by Nullmeyer on the history and development of the wire industry.

✦ ✦ ✦

MR. NULLMEYER came to Struthers in March, 1909, shortly after the acquisition of the Morgan Spring Co. by Sheet & Tube. Since that time he virtually built the present plant which later included a conduit department. Today it is one of the most modern wire mills in the country, engaging in normal times about 500 men.

✦ ✦ ✦

MR. NULLMEYER became a noted mechanical engineer without having attended a technical college. Born September 5, 1874, at Homestead, Pa., he attended public schools until the age of 15, and then went to work as a plumber's apprentice at 50 cents a week. Later, he got his first experience in a steel mill in the cold rolling department of Jones & Laughlin Corporation at $5 a week.

✦ ✦ ✦

INTENSELY interested in mechanics as a young man, and after hard days in the mill, he took up mechanical drawing in the night classes of the Pittsburgh Y. M. C. A. He soon left the steel mill and went to work as a machinist apprentice, becoming a full fledged machinist three years later. Working days, he never neglected his self-education. He took a correspondence course in mechanical engineering and chemistry, completing the engineering course.

✦ ✦ ✦

AFTER serving two years as an engineer apprentice, in 1899 he got his first engineering job as a draftsman with the Shoenberger Steel Co., Pittsburgh, in 1889, and when this concern was absorbed by the U. S. Steel Corporation a year later, he was chief draftsman. Later he was made assistant chief engineer of the Pittsburgh district, and March 1, 1903, became assistant superintendent of the Rankin mill of the American Steel & Wire Co.

✦ ✦ ✦

IN the same position, he went later to the Donora plant, advancing to superintendent at Rankin, and later at Braddock, from which plant he came to Sheet & Tube, March 22, 1909, and had been in the same post ever since.

A Review of Recent Wire Patents

No. 1,972,225, APPARATUS FOR FINISHING HEADS AND POINTS OF BOLTS, Patented September 4, 1934, by Henry J. Hogue, Lakewood, Ohio, assignor to The Wasmer Bolt & Nut Company, Cleveland, Ohio, a corporation of Ohio.

The device includes a cutting tool independent of the dies provided for operating on the end portion of the bolt, this cutting tool having its cutting edge arranged substantially in the plane of movement of the bolt axis and operating on the end of the bolt to shave down this end and form a finished flat surface thereon during the threading operation.

✦ ✦ ✦

No. 1,972,397, SPRING CUSHION CONSTRUCTION, Patented September 4, 1934, by William B. Foster, Utica, N. Y., assignor to Foster Brothers Manufacturing Company, Utica, N. Y., a corporation of New York.

A silencer pad is provided for this wire spring assembly, the pad being located intermediate the ends of the helical springs.

✦ ✦ ✦

No. 1,972,473, METHOD OF DRAWING WIRE, Patented Sept. 4, 1934, by David D. Buchanan, Massillon, Ohio, assignor to Union Drawn Steel Company Massillon, Ohio, a corporation of Pennsylvania.

This method of drawing steel wire includes winding the wire into coils, pickling the coils, then assembling a number of pickled coils one upon another upon a reel, drying the coil and transporting the reel with the coils to a wire block and drawing off the wire of the coils in succession from the reel with rotation thereof and feeding it into the wire block.

✦ ✦ ✦

No. 1,972,625, ELECTRIC CABLE, Patented September 4, 1934, by Philip Vassar Hunter, London, England, assignor to Callender's Cable and Construction Company, Limited London, England, a British company.

More specifically, the invention has to do with a high tension cable having an insulating material such as paper permeated by an inpregnating material. Means is provided for dealing with the change in volume of the impregnating liquid.

✦ ✦ ✦

No. 1,972,638, ARTICLE OF MANUFACTURE FOR REENFORCING, Patented September 4, 1934, by Charles F. Bailey, Peoria, Ill., assignor, by mesne assignments, to The National City Bank of Cleveland, Cleveland, Ohio, a corporation, and John A. Chapman, Chicago, Ill., trustees, and 1,973,639.

These inventions have to do with a paper-back wire fabric for stucco reinforcing.

✦ ✦ ✦

No. 1.972,746, FLUID DISTRIBUTING MEANS FOR WIRE DRAWING MACHINES, Patented September 4, 1934, by Edwin J. McIllvried, Akron, and Jesse C. Bittman, Cuyahoga Falls, Ohio, assignors to The Vaughn Machinery Company, Cuyahoga Falls, Ohio, a corporation of Ohio.

Complete Descriptions and Drawings of Patents May Be Had for 25 cents. Address, Wire & Wire Products, 17 East 42nd St., New York.

No. 1,972,877, CONCENTRIC RETURN TRANSMISSION SYSTEM, Patented September 11, 1934, by James M. Eglin, Glen Rock, N. J., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York.

The construction includes a central wire conductor and a tubular return conductor concentric therewith. Means is provided to apply to the cable signal waves extending in frequency into the carrier telephone range, the thickness of the return conductor being the optimum as regards attenuation for a frequency at least as high as the maximum signaling frequency transmitted.

✦ ✦ ✦

No. 1,973,189, WIRE FABRIC SEAM, Patented September 11, 1934, by Albert B. Weissenborn and William E. Buchanan, Appleton, Wis., assignors to Appleton Wire Works, Inc., Appleton, Wis., a corporation of Wisconsin.

This seam is provided for Fourdrinier wire belts. The seam lacing wire passes around the end weft wire only of one fabric part to form a hinge connection and passes around the second last weft wire of the other fabric part so as to minimize relative displacement of the lacing wire with respect to the second fabric part.

✦ ✦ ✦

No. 1,973,302, ALLOY, Patented September 11, 1934, by Robert J. Wiseman, Passaic, and Benjamin B. Reinitz, Paterson, N. J., assignors to The Okonite-Callender Cable Company, Incorporated, Paterson, N. J., a corporation of New Jersey.

This alloy is stated to be especially desirable for the sheaths of electric power cables and comprises substantially 98.85% of lead; 25% of Antimony and .005% Vanadium.

✦ ✦ ✦

No. 1.973,596, CAPSTAN FOR WIRE DRAWING MACHINES. Patented September 11. 1934, by Reuben C. Yousey, Rome, N. Y.

The capstan includes gears adapted to distribute the differential velocity among the several sheaves making up the capstan so that the wire may be wound thereon in a uniform manner.

✦ ✦ ✦

No. 1,973,667, COILING OF SPRINGS, Patented September 11, 1934, by Frank Sleeper, Avers Cliff, Quebec, Canada, assignor to Sleeper & Hartley, Inc., Worcester Mass., a corporation of Massachusetts.

The method comprises feeding a length of wire and bending a predetermined length of the wire at right angles to the line of feed, then feeding the bent stock, winding the stock into a predetermined number of convolutions by holding the bent portions straight and finally after severing the wire, bending a second predetermined length of the wire into parallel relation with the first bent portion.

Reissue No. 19,320, MATERIAL WINDING MACHINE, Patented September 18, 1934, by Chester A. Purdy, Oak Park, Ill., assignor to Western Electric Company, Inc., New York, N. Y., a corporation of New York.

In this winding machine, a holding element is provided mounted for movement relative to the widing arbor, a retaining device being provided for holding the holding device away from the arbor. Means is also provided adapted to be actuated in timed relation with the winding operation to release the retaining device, the holding device being pressed upon the material being wound on the arbor.

✦ ✦ ✦

No. 1,974,712, SUBMARINE CABLE FOR COMMUNICATION PURPOSES, Patented September 25, 1934, by Konrad Goes, Rosrath, near Cologne, and Ernst Badum, Cologne-Mulheim, Germany, assignors to Felton & Guilleaume Carlswerk, Actien-Gessellschaft, Cologne-Mulheim, Germany.

This submarine cable has an insulation of hydro-caoutchouc mixed with other thermo-plastic insulating material.

✦ ✦ ✦

No. 1,972,066, COATED FERROUS WELDING WIRE, and COATED WELDING ELECTRODE, Patented August 28, 1934 by Harry R. Pennington, Los Angeles, Calif., assignor to Indiana Steel & Wire Company, Muncie, Ind., a corporation of Indiana.

The first of these patents comprises an iron wire core and a coating impervious to moisture comprising a lacquer serving as a binder and having ingredients uniformly dispersed there-through including a metal carbonate and silica flour in the approximate proportions by weight eight units of the metal carbonate and one of the flour while the last patent comprises a welding rod having a flux coating of which gum arabic forms at least 8%.

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No. 1.972,063, COATED FERROUS WELDING ELECTRODE, Patented August 28, 1934 by Paul R. Judy, Muncie, Ind., assignor to Indiana Steel & Wire Company, Muncie, Ind., a corporation of Indiana.

The coating comprises a mixture which contains at least five per cent of finely divided solid cellulose acetate, at least fifteen per cent of an alkali metal silicate, and a solid oxide which remains solid at least up to a temperature approximating the melting point of the electrode core and which has acid properties in the forming of a slag from the coating mixture.

✦ ✦ ✦

No. 1,971,104, AGITATING MEANS FOR WIRE SCREEN DURING GALVANIZING PROCESS, Patented August 21, 1934 by Noah S. Harter, Waukegan, Ill., assignor to Cyclone Fence Company, Waukegan, Ill., a corporation of Illinois.

The construction includes wire forms or arms so positioned that the wire screen will strike thereagainst and thus dislodge any surplus liquid adhering to the screen.

Exports and Imports of Wire

Exports of Iron and Steel Wire Products in August 1934 and August, 1933
(In gross tons)

	August 1934	July 1934	August 1933
Wire rods	1,414	576	1,268
Hoops, bands and strip steel	1,840	2,556	1,939
Plain black or galvanized iron or steel wire	3,532	3,241	3,320
Barbed wire and woven wire fencing	3,752	3,033	3,817
Woven wire screen cloth	133	83	71
Wire rope	158	248	181
Insulated iron or steel wire and cable—see analysis below			
Other wire and manufactures	323	444	298
Wire nails	996	809	1,442
Tacks	38	57	55
Other nails, including staples	409	291	336
Bolts, machine screws, nuts, rivets and washers	463	427	240
Total, these 11 classifications	13,058	11,765	12,957

Imports of iron and steel wire and wire products into the United States
(In gross tons)

Concrete reinforcement bars	142	336	99
Hollow bars and drill steel		131	54
Merchant steel bars	1,675	1,881	1,518
Wire rods	720	791	1,174
Barbed wire	830	1,098	347
Round iron and steel wire	187	315	378
Telephone and telegraph wire	19		10
Flat wire and strip steel	245	132	168
Wire rope and strand	170	166	179
Other wire	71	131	189
Hoops and bands	2,323	1,868	3,303
Nails, tacks and staples	428	1,198	379
Bolts, nuts and rivets	19	1	18
Total, these 13 classifications	6,829	8,048	7,816

GAINING 9,761 gross tons, exports of iron and steel products from the United States in August reached a total of 242,947 tons—4.2 percent above July total and the second highest trade registered by any month this far this year. This increase as accomplished wholly without the aid of the trade in scrap iron and steel which, declining 270 tons, was carried on at the high figure of 155,542 tons.

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IMPORTS—at 32,418 tons—increased by 14,742 tons or 83.5 percent, in comparison with the July trade, this gain being more than accounted for by the sharply increased receipts of pig iron.

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FOR the second consecutive month the trade with Japan set a new high—the August figures of 114,286 tons being 10,000 tons higher than the record trade of July. Included in the August trade was 109,048 tons of scrap (also a record movement), 3,194 tons of tin plate, and 1,223 tons of wire rods. Canada's total of 25,882 tons included 8,770 tons of skelp, 3,578 tons of scrap, 3311 tons of heavy rails, 1,965 tons of black steel sheets, 1,951 tons of plain structural shapes, and 1,136 tons of steel bars. Scrap made up 21,068 tons of the 21,711 tons sent Italy, and 11,693 tons of the 11,743 tons exported to Poland. Mexico's purchases of 10,517 tons included 2,406 tons of scrap, 1,407 tons of black steel sheets, 1,399 tons of cast iron pressure pipe and fittings, and 1,013 tons of car wheels and axels. The trade with Argentina—6,041 tons—included 2,285 tons of seamless casing and oil line pipe, 878 tons of tin plate, and 752 tons of galvanized wire, while the 5,540-tons trade with Brazil included shipments of 1,167 tons of black steel sheets, 1,139 tons of barbed wire, and 943 tons of galvanized steel sheets.

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AMONG the imports pig iron was, preeminently, the leading product in the month's trade—coming chiefly from the Netherlands (11,751 tons), British India (5,135 tons), and Spain (300 tons). Second—and far behind pig iron—was structural shapes (2,480 tons) had principally from Belgium (1,819 tons), France (426 tons), and Germany (216 tons). Then there was hoops and bands—an item in which the trade is mounting seasonally—of which 2,323 tons were received—1,139 tons from Belgium, 491 tons from Germany, 433 tons from France, and 243 tons from the United Kingdom. Ferro-manganese and spiegeleisen—1,818 tons—was had from Norway (1,010 tons), Canada (600 tons), and the United Kingdom (161 tons), while last among the more important classes of products was merchant and other steel bars—1,675 tons in all—1,049 tons of which came from Belgium, 290 tons from Sweden, 183 tons from France, and 111 tons from Germany.

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THE Netherlands once more assumed, in August, the position of chief supplier of iron and steel products to the United States—its total of 11,885 tons of all products including 11,751 tons of pig iron. Belgium, the principal factor in "other than pig iron" trade, was second with a total of 5,221 tons, including 1,819 tons of structural shapes, 1,139 tons of hoops and bands, and 1,049 tons of merchant and other steel bars. British India followed closely with 5m135 tons of pig iron, while Norway was fourth with a total of 2,328 tons, included in which was 1,084 tons of pig iron and 1,010 tons of ferromanganes. Germany with 2,045 tons was fifth and included in its trade shipments of 491 tons of hoops and bands, 490 tons of barbed wire, and 303 tons of nails. Sixth, and just smaller than Germany, was Sweden with a total of 2,035 tons, including 650 tons of wire rods, 300 tons of pig iron, 243 tons of flat wire and strip steel, and 191 tons of "other" pipe.

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IMPORTS of card clothing declined sharply to 8,244 square feet valued at $11,111—this total being divided between the United Kingdom (7,348 square feet valued at $10,398) and Germany (896 square feet valued at $713).

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WIRE cloth and screening receipts were only slightly lower at 68,718 square feet. Germany was the principal factor in this trade with a total of 46,013 square feet.

'Round the World With the Wire Industry

American Products In Demand In Greece

INTEREST among Greek importers in American semi-manufactured iron and steel products is steadily increasing. Attention is currently centered upon wire rods of 5 to 8 mm. in diameter (for the local wire industry), in galvanized plain and corrugated sheets, and in coke tin plate. American wire rods are comparatively new to the Greek market, but initial shipments just received having proven very satisfactory, prospects for future sales are encouraging, provided prevailing import restrictions can be eased somewhat.

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Prices Rise In Japan

ADVANCES of from 5 to 20 percent have marked the course of iron and steel prices in Japan since the end of May. This rise is directly attributable to the decrease in domestic production, which in turn is due not to any slackening in demand, but to the serious drought in the Kyushu district which has curtailed the operations of the Yawata Plant of the Japan Iron Manufacturing Company.

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Japan Enters Peruvian Iron And Steel Market

JAPAN is reported to be penetrating the Peruvian market for iron and steel products; No representatives appear to have been appointed to Peru by Japanese firms, but offers on many lines have been received by local import houses directly from Japan. Products specifically offered are iron bars in various profiles, wire nails (particularly with countersunk checkered heads) and small diameter wire. Japanese quotations are reported in line with those of American producers, but the terms offered range from payment over long periods of time to shipment on a consignment basis. As far as is known, only one important shipment of Japanese iron and steel has been made to Peru and that, on a consignment basis, went to a local Japanese firm. The cost of the bars, sheets, nails and wire which made up this shipment being higher at consignee's warehouse than that of goods received from other countries, it is reported that they will be disposed of at the best prices obtainable.

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Steel Plant At Mysore

AS previously reported, the proposal to establish a steel plant to operate in conjunction with the present Bhadravati Iron Works has now reached the stage where the Government of the state of Mysore has appropriated the sum of Rs. 2,100,000 for the purpose, and a selection of suppliers for the mechanical and electrical equipment—both German—has been made. The proposed plant will include open hearths of 25 to 30 tons capacity, rolling mill equipment to produce bars one-half inch or less in diameter and for the manufacture of a small quantity of steel strip. Present plans call for the plant to be ready to operate by about October 1935.

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Expansion Programs In Japan

VARIOUS plans for the expansion of existing mills and equipment are constantly being advanced in Japan. The most ambitious plans are those of the Japan Iron Manufacturing Company, as the Government looks to this company to bring about a reduction in the present high domestic prices of steel and manufactures. Included in this project are plans for the erection of a new 1,000-ton blast furnace at a cost of 6,000,000 Yen (at least a part of which will be bought abroad) on which work is to begin in October 1934, with operation hoped for by the end of 1936; the building of 50,000-ton hoop mill at the Fuji Steel Works at a cost of 1,300,000 Yen; the erection of a low-temperature coal distillation plant at the Wanishi Works for the purpose of producing 8,000 tons of gasoline and other oils and 75,000 tons of coilite annually; the expenditure of 40,000,000 Yen over the next one and one-half years in expanding capacity until 360,000 tons of pig iron and 300,000 tons of steel can be made annually—this expansion to include the immediate construction of two 10-ton electric furnaces at Yawata, and a "fine dressed" steel sheet mill with an annual capacity of 15,000 tons of automobile sheets.

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IN addition to the foregoing, other projects being put forward include: (1) The Asano-Kokura Steel Works plans through an increase of 33 percent in its capitalization to increase its facilities for the production of bars, rods, angles, channels, and I-beams; (2) the Japan Galvanized Iron Sheet Manufacturing Company has bought a German plant at the cost of 300,000 yen and expects to be producing galvanized hoops by the end of January 1935; while (3) the Japan Stainless Steel Company, Ltd., plans the erection of a mill at Naoyetsu, Niigata Prefecture, for the production of 5,000 tons of the softest stainless steel.

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New Foundry In Palestine

TEL AVIV (Palestine) is to be the site of a foundry to be known as the "Herzfeld and Victorious Works". Bath-tubs, sinks, cast iron pipe and like products will be made. The foundry will employ 600 workmen and 12 technicians and will represent an investment of LP. 50,000.

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Competition In Wire Rods

CLEARLY evidencing their intention to compete with the Japan Wire Rod Sales Guild for the Japanese market for wire rods,

'Round the World With the Wire Industry

the European Wire Rod Syndicate promptly reduced its quotation on this product to 91.00 yen from 93.80 yen when the Guild cut its price from 97.00 yen to 93.00 yen as a competitive measure. There is but little doubt but that the relatively heavy exportation of wire rods from Japan in the first half of 1934 has caused the European Syndicate some alarm—shipments during this period having risen to 17,257 metric tons valued at 2,668,980 yen as compared with the 1933 figure of 9,822 tons valued at 1,698,863 yen. Manchuria and the Kwantung Leased Territory are the principal markets for Japanese wire rods, but the growing shipments to British India, the Netherland, East Indies, the Straits Settlements, and Siam aroused the attention of the European Syndicate.

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German Notes

ELECTRON wire is now the chief substitute for tinned steel wire for the manufacture of artificial flowers, fine wire gauze and the motor car and precision apparatus industry, and its production has been trebled.

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THE German wire industry is participating in the plan of the hardware industry to establish approximately eleven sales branches in South Africa which will sell directly to the country Ironmongers and wholesale merchants.

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A BARTER contract has been signed between Brazil and Germany concerning the direct exchange of approximately 2000 tons of barbed wire and other wire products against Brazilian raw materials.

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THE demand for higher import duties on wire and wire products raised by the German industry has been refused by the Government, and will be left unaltered.

EXPORT business in wire ropes, barbed wire and wire netting is improving. The export figures for wire ropes are now between 700 and 750 tons monthly, which is approximately 100 tons better than last year. This improvement is particularly noticeable in the U. S. A. and the Latin American Republics. Wire netting is being absorbed by South Africa and the Far East but the wire nails business is unsatisfactory as England, the best customer, has raised import duties again.

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THE latest German unemployment act, by which all workmen of less than 25 years of age must resign and make place for older unemployed men, will affect approximately 2200 German wire workmen, in more than 550 German plants, with the exception of married men, those who support families, those who are members

MICROMETER PRECISION MICRO-WELD TRADE MARK REG. U. S. PAT. OFF.

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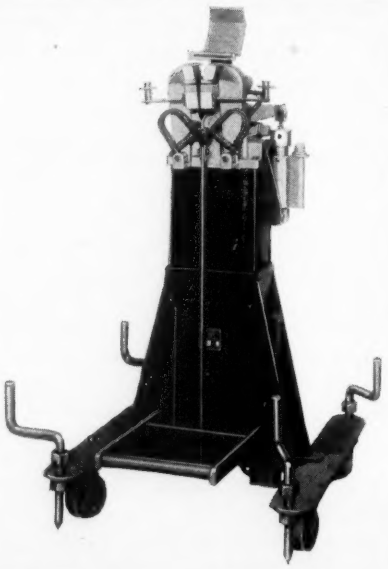

MICRO PRODUCTS COMPANY

20 NORTH WACKER DRIVE, CHICAGO, ILL.

Telephone State 7468 General Offices and Factory, Peoria, Ills.

of one of the German Nazi semi-military organizations or have already been in the Labor Service. Those unemployed older workmen, who had been out of work for more than eighteen months will first take a training course of 2 to 4 weeks duration at Government expense to regain their lost skill. It is said that all married unemployed men over 30 years of age will again be put to work. In the first place all the old men will be reinstalled. In the steel industry, due to the improvement in production in August (1,067,000 tons) which is 70% better than 1932, the number of unemployed decreased by 80% compared with 1929. Most of the young workmen who will lose their places will go into the Labor Service, which period has been extended from 6 to 9 months and will shortly be extended to one year.

OUTSIDER competition on the wire market in Europe is growing rapidly, having been quiet for many months past. This is particularly the case regarding wire nails and plain wire, in which the Belgian outsider works, Trefilerie Franco-Belge d'Anvers, are keenly competing.

✦ ✦ ✦

British Refinery Establishes Flying Service

THE new copper refinery at Prescot, near Liverpool, is the only one of its kind in the United Kingdom.

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THE refinery is operated by British Copper Refinery, Ltd., a subsidiary concern of British Insulated Cables, Ltd., whose works it adjoins. The refinery produces daily nearly 170 tons of high-conductivity copper from "blister pigs" imported from Rhodesia.

✦ ✦ ✦

THE firm announces that it intends to make regular use of air travel to enable its clients from various parts of the United Kingdom to inspect the factory and discuss details of contracts with a more intimate knowledge of the processes of production. This is certainly twentieth century salesmanship.

✦ ✦ ✦

SIMPLIFIED practice recommendation R150-34, Copper Wire Nails, is now available in printed form, and copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 5 cents each.

✦ ✦ ✦

THIS program is concerned with length and gage of common copper wire nails with flat heads and copper wire slating nails.

— DESCO —

A PICKLING STABILIZER ▲ ▲ ▲
FOR CARBON STEELS ▲ ▲ ▲

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The strong passivating effect of this excellent inhibitor insures a bright finish and forms a sound basis for a bright drawing technique—

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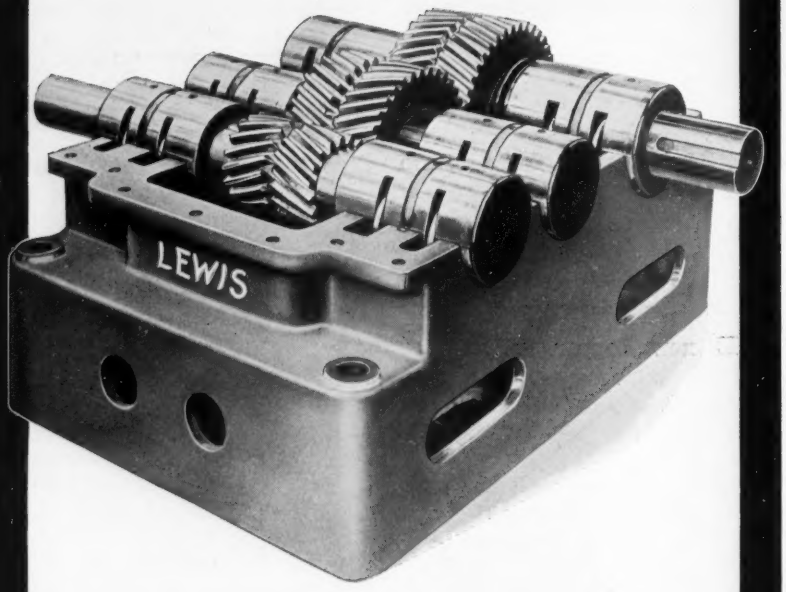
LEWIS HIGH SPEED GEAR SET



FOR CONTINUOUS ROD MILL

Lewis High Speed Gear Sets are in use where quality and efficiency really count. The largest and most up-to-date rod mill unit in the world utilizes Lewis Gear Sets for driving its roll stands.

Lewis gear housings are of two piece type with special alloy forged steel herringbone cut tooth gears running in babitted shell type or roller bearings. One Lewis gear set is used for driving two roll stands which is a special feature for controlling roll speeds when driven by either individual motors or bevel gear drives. Lewis gear sets are totally enclosed and gears and bearings run continuously in oil.

Lewis Engineers will gladly cooperate with you in designing special machinery to meet your problems.

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Boron Carbide

THE hardest material yet produced by man, closely approaching the diamond, was announced by Raymond R. Ridgway of the Research Laboratories of Norton Company, Worcester, Mass. before the Electrochemical Society at Hotel Pennsylvania, September 27th.

✦ ✦ ✦

THIS new material, chemically known as boron carbide, is a combination of the rare metal, boron and ordinary carbon, such as occurs in coke. The diamond is known as crystallized carbon, while the new product is a form of carbon crystallized with boron. Boron carbide is so hard that it readily scratches and cuts the hardest of known synthetic materials which have previously existed.

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BORON carbide, which is unaffected by the strongest acids and alkalis, has compressive strength of 260,000 pounds per square inch, coefficient of expansion approximately two thirds that of steel, is little affected by temperature up to 1000 degrees Centigrade, at which point the diamond burns completely, and it is lighter than aluminum.

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FOR the drawing of fine wires of all kinds it has always been economical to use large diamonds which have been carefully drilled to produce wire of a definite size by drawing through the opening of metal bars a slightly larger size and reducing successfully the size of the metal rod until it is sometimes made so small that it is finer than the most delicate human hair. This application has been made of the new carbide and its use has been extended in this field. It has found application also for extruding dies, showing almost unbelievably long life with some materials.

✦ ✦ ✦

WEAR resistant bearings of all kinds have been manufactured of the new product suitable for inclusion in such widely different uses as electric meters and high speed rotating spindles on grind-

(*Please turn to page 423*)

Boron Carbide

(*Continued from page 422*)

ing machines. Here the high polish and hardness of the boron carbide approaches that obtainable with the highest grade industrial diamonds. In a certain sense, therefore, boron carbide is a substantial attainment of industrial diamonds by synthetic means.

✦ ✦ ✦

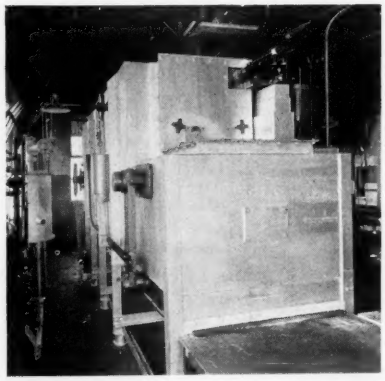
New Scale Free Hardening Furnace

A SPECIAL atmosphere, continuous chain belt conveyor furnace for the scale free hardening of miscellaneous small and medium size products has been developed by The Electric Furnace Company, Salem, Ohio.

✦ ✦ ✦

THE material to be treated is fed onto a rugged, cast link belt conveyor, conveyed through the furnace in a special protective atmosphere and discharged through a sealed chute to quench. The material comes out absolutely free from scale.

✦ ✦ ✦



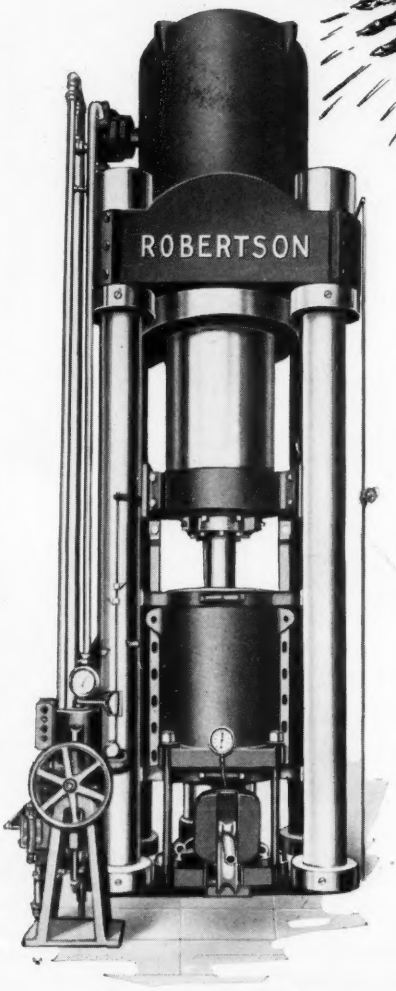
A COMBUSTION type generator is provided with the furnace for supplying the special protective atmosphere used in the equipment.

✦ ✦ ✦

THIS type of furnace may also be used for bright annealing, and the brazing or joining of metal parts.

✦ ✦ ✦

THE accompanying photograph shows the charging end of the furnace, the controlled atmosphere generator is shown in the rear.



Robertson makes all types of lead-encasing machinery required by manufacturers of rubber hose and electric cables: Extrusion Presses, Hydraulic Pumps, Melting Furnaces and Pots, Dies and Cores, Strippers, etc. WRITE FOR DETAILS.

This Robertson Lead Cable Encasing Press

—places a uniform sheath of Lead upon Electric Cables . . . in one smooth operation.

We take most of our mechanical wonders for granted, possibly because we have grown-up with them, so to speak. But, have you ever calmly stood and watched your Lead Encasing Presses in operation? Truly, they're almost magical in their work, aren't they?

Robertson Lead Presses make and apply Lead Sheath to all types of insulated wires and cables, from ¼" to 5" diameter. We regularly build Cable Presses from 1,000 to 2,500 tons Hydraulic Capacity and are prepared to furnish all allied equipment.

Note: If you would like to be placed on our mailing list to receive regular issues of our little House Organ entitled ROBERTSON REMINDERS — just send us your name and address.

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LATEX

A New Insulation

LAYTEX, a new insulation, is announced by the United States Rubber Company.

THE special claims made for it are:

1. It is the most flexible.
2. It has the greatest tensile strength and resistance to compression.
3. It has the highest dielectric strength and insulation resistance.
4. It permits thinner but superior walls which make possible finished conductors lighter in weight and smaller in bulk.

THIS product is derived directly from latex, the milk of the rubber tree. Through patented processes are removed all proteins, sugars and water solubles—the materials which are susceptible to moisture and which makes a sieve of ordinary insulation.

✦ ✦ ✦

A CONDUCTOR is then run through a series of baths of liquid and during each bath the conductor takes on a film o finsulation which is almost immediately converted from liquid to. solid The liquid is solidified on any given section of the conductor before the section is in physical contact with any mechanical support, and because of this, mechanical defects found in ordinary types of insulation are avoided.

✦ ✦ ✦

AS a result of the patented process of removing materials that cause electrical leakage and as a result of the novel manufacturing method, Laytex possesses vastly superior physical and electrical properties.

✦ ✦ ✦

ELONGATION tests show that Laytex has a stretch of 750 per cent, which establishes it as the most flexible insulation known. This extra stretch naturally provides an important margin of safety.

✦ ✦ ✦

THE tensile strength of this new insulation is 5,000 pounds per square inch, which approaches the tensile strength of non-flexible types of insulation. It is possible

(*Please turn to page 425*)

Latex

(*Continued from page 424*)

that, on account of its great strength and resistance to compression this insulation may be adapted to service conditions in which non-flexible metallic coverings are now necessary.

✦ ✦ ✦

BECAUSE the film of insulation is coagulated directly onto a conductor from a liquid state, natural laws of physics guarantee perfect centering and uniform wall thicknesses which assure superior insulation.

✦ ✦ ✦

OWING to its purity and uniformity, it is claimed that this new material has the highest dielectric constant of any known flexible insulation. Its insulation resistance constant is more than twice as high as that of the best grade rubber compound required by the American Society of Testing Materials specifications.

✦ ✦ ✦

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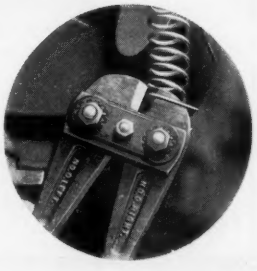

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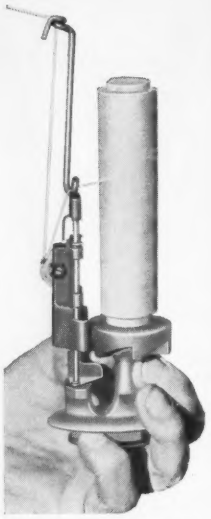

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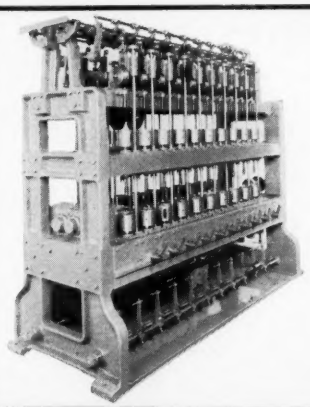

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Survey of Accounting Methods

MANY organizations with affiliates, subsidiaries, or branches have the problem of how best to account for the transfer of materials and products between plants. The report of a survey of inter-company accounting policies as represented by the practices of a number of corporations is now announced. The report is not so much concerned with details of accounting practice as with the executive policies involved as revealed by the methods of the 34 companies that contributed to the investigation.

✦ ✦ ✦

AS the report points out, there are two general types of inter company commodity sales and transfers: those taking place continously as normal procedure within an organization; those that are casual and take place because of special circumstances that may arise occasionally. The report considers the pricing of such sales and transfers, discussing use of market price as basis, the use of cost, or cost plus an additional charge. Combinations of these methods were formed to exist and are described. Time of billing and methods of settlement are also discussed.

✦ ✦ ✦

A DETAILED account of the practices of each of six of the 34 companies is presented in a separate section of the report and a brief tabular resume of the basic policies of all the companies is given. Copies of this report, which is entitled, "Accounting Policies in Inter-Company Sales and Transfers" may be had by addressing the Policyholders Service Bureau, Group Insurance Division, Metropolitan Life Insurance Company, One Madison Avenue, New York, N. Y.

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THE United States Brass and Copper Co., Hyde Park Avenue, Hyde Park, Mass., will start operation on November 1st. Mr. Debons as Purchasing Agent and who was formerly with the American Tube Company, will be in charge.

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Rod Frames—16″ Frames, 8″ Frames —Take-Up Frames, Wire Pointers—Puller Tongs.
General Castings for Wire Mill use.
Circulars on Request.
E. J. SCUDDER FOUNDRY & MACHINE CO.
TRENTON, N. J.

HIGH SPEED
Welding Wire Straightening and Cutting Machinery
Round Wire Straightening and Cutting Machinery
Flat Wire Straightening and Cutting Machinery
Roll and Rotary Wire Straighteners
THE F. B. SHUSTER CO.
New Haven, Conn.
Straightener Specialists Since 1866

BISCO
TUNGSTEN CARBIDE DIES
For Wire, Rod and Tubing
Bare Nibs — Semi-finished — Finished
Round and Special Shapes
THE BISSETT STEEL COMPANY
Cleveland
Worcester Philadelphia Cincinnati

Wire Mill Equipment, Stranding, Insulating, Drawing, Welding
Thomson-Judd Wire Machinery Co.
Subsidiary of
Thomson-Gibb Electric Welding Co.
Lynn, Massachusetts.

VIANNEY
Famous Wire Drawing Diamond Dies
250 East 43rd St., New York

Wire Drawing Diamond Dies
COCHAUD
WIRE DIE CORPORATION
300 W. 56th ST., NEW YORK
Tel. Col. 5-1340

BUYERS' GUIDE

For more complete information, consult the annual Directory, Index & Buyers' Guide.

ABRASIVES—
Norton Co., Worcester, Mass.

ANNEALING FURNACES
See Furnaces—Various Headings

ANNEALING POTS AND BOXES
Scudder, E. J., Fdry & Machine Co., Trenton, N. J.

ARMORING EQUIPMENT
Amer. Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

BAKERS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

BORON CARBIDE—
Norton Co., Worcester, Mass.

BRAIDER CARRIERS—
Apco Mossberg Corp., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.

CASTINGS—Wire Mill
E. J. Scudder Foundry & Machine Co., Trenton, N. J.

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CHEMICALS—Cleaning
American Chemical Paint Co., Ambler, Pa.
Delany Chemical Co., Tacony Station, Philadelphia, Pa.
Grasseli Chemical Co., Cleveland, O.

CLEANING & PICKLING EQUIPMENT
Broden Construction Co., Cleveland, O.
Duriron Co., The, Dayton, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

COATING—Protective
American Lanolin Corp., Lawrence, Mass.

COILERS—Sheet Wire
H. J. Ruesch Machine Co., Newark, N. J.

CRANES—Wire Mill
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTERS—Wire, Rod, Bar
Porter, H. K., Co., Everett, Mass.

DIES—Diamond
Balloffet Diamond Wire Dies Co., Inc., N. Y. C.
Cochaud Wire Die Co., New York.
Driver-Harris Co., Harrison, N. J.
Kelly Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York.

DIES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Cochaud Wire Die Corp., New York.
Driver-Harris Co., Harrison, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Vianney Wire Die Wks., N. Y.

DIES—Rod and Tube Drawing
Bissett Steel Co., Cleveland, O.
Carboloy Co., Inc., Newark, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.

DIES—Tantalum Carbide
Kelly Wire Die Corp., New York, N. Y.

DIES—Tungsten Carbide
Bissett Steel Co., Cleveland, O.
Carboloy Co., Inc., Newark, N. J.
Driver-Harris Co., Harrison, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.

DRAW BENCHES
H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.

ENGINEER—Consulting Wire Mill
Lewis, Kenneth B., New York, N. Y.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FILLERS—Paper for Cable
E. W. Twitchell, Inc., Phila., Pa.

FURNACES—Annealing
Bellis Heat Treating Co., Branford, Conn.
Electric Furnace Co., Salem, O.

FURNACES—Automatic
Electric Furnace Co., Salem, O.

FURNACES—Bright Annealing
Bellis Heat Treating Co., Branford, Conn.
Electric Furnace Co., Salem, O.

FURNACES—Electric
Bellis Heat Treating Co., Branford, Conn.
Electric Furnace Co., Salem, O.

FURNACES—Lead Melting
Electric Furnace Co., Salem, O.
John Robertson Co., Brooklyn, N. Y.

FURNACES—Non-Oxidizing
Bellis Heat Treating Co., Branford, Conn.
Electric Furnace Co., Salem, O.

FURNACES—Wire, Strip and Sheet
Bellis Heat Treating Co., Branford, Conn.
Electric Furnace Co., Salem, O.

GRINDERS—Roll
Norton Co., Worcester, Mass.

INHIBITORS
American Chemical Paint Co., Ambler, Pa.
Delany Chemical Co., Tacony Station, Philadelphia, Pa.
Grasseli Chemical Co., Cleveland, O.
Wm. M. Parkin & Co., Pittsburgh, Pa.

INSULATION—Cable or Cable Filler
E. W. Twitchell, Inc., Phila., Pa.

LATHES—Die Reaming
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

LIME—Pulverized
Amer. Lime & Stone Co., Bellefonte, Pa.

LUBRICANTS—Wire Drawing
R. H. Miller Co., Homer, N. Y.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
John Robertson Co., Brooklyn, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Gibb Electric Welding Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
Fidelity Machine Co., Philadelphia, Pa.
New England Butt. Co., Providence, R. I.
Textile Machine Works, Reading, Pa.
Watson Machine Co., Paterson, N. J.

MACHINERY—Brazing
Thomson-Judd Wire Machinery Co., Lynn, Mass.

MACHINERY—Bunching
Amer. Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Electric
American Insulating Machinery Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Thomson-Gibb Electric Welding Co., Lynn, Mass.
Watson Machine Company, Paterson, N. J.

MACHINERY—Chain Making
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Closing
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Coilers
Broden Const. Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Copper Wire Drawing and Rolling
H. J. Ruesch Machine Co., Newark, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.

Statement of ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of Wire & Wire Products published monthly at Washington, N. J., for October 1, 1934.

State of New York, County of New York, ss.: Before me, a Notary Public in and for the State and county aforesaid, personally appeared R. S. Spengel, who, having been duly sworn according to law, deposes and says that she is the Secretary-Treasurer of Wire & Wire Products and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management, (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Quinn-Brown Publishing Corporation, 17 East 42nd St., N. Y. City; editor, Richard E. Brown, 17 East 42nd St., N. Y. City; managing editor, none; business manager, Richard E. Brown, 17 East 42nd St., N. Y. City.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Quinn-Brown Publishing Corporation, 17 East 42nd St., New York City, Jennie R. Baker, Hammonton, N. J., and Leta B. Brown, of 17 East 42nd St., New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

R. S. SPENGEL
(Secretary-Treasurer)

Sworn to and subscribed before me this 20th day of September, 1934.

(SEAL) CHARLOTTE FRANKE,
Notary Public.

BUYERS' GUIDE, Continued

MACHINERY—Cutting
Broden Construction Co., Cleveland, O.
Hallden Machine Co., Thomaston, Conn.
F. B. Shuster Co., New Haven, Conn.
Sleeper & Hartley, Worcester, Mass.

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Extruding
John Robertson Co., Brooklyn, N. Y.
John Royle & Sons, Paterson, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Flat Wire
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Forming
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Galvanizing Wire
Broden Construction Co., Cleveland, O.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Gang Winders
H. J. Ruesch Machine Co., Newark, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., Worcester, Mass.

MACHINERY—Insulating
American Insulating Machinery Co., Phila.
Jenny, R. Harry, New Haven, Conn.
New England Butt Co., Providence, R. I.
John Royle & Sons, Paterson, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lead Encasing Presses, etc.
John Robertson Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
John Robertson Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Measuring Wire & Cable
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Panning
American Insulating Machinery Co., Phila.

MACHINERY—Pointing
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Rod Mill
Broden Construction Co., Cleveland, O.
Morgan Const. Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
Lewis F'dry & Machine Co., Pittsburgh, Pa.

MACHINERY—Rolling Mill
Broden Construction Co., Cleveland, O.
Lewis F'dry & Machine Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Rubber Strip Covering
New England Butt Co., Providence, R. I.
John Royle & Sons, Paterson, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Rubber Tubing and Straining
John Royle & Sons, Paterson, N. J.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y Co., Phila. Pa.
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry and Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spooling
American Insulating Machinery Co., Phila.
Fidelity Machine Co., Philadelphia, Pa
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spring Making
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Broden Construction Co., Cleveland, O.
Hallden Machine Co., Thomaston, Conn.
H. J. Ruesch Machine Co., Newark, N. J.
F. B. Shuster, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Stranding
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Broden Const. Co., Cleveland, O.
Lewis F'dry & Machine Co., Pittsburgh, Pa.
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Swaging
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Worcester, Mass.

MACHINERY—Taping
Amer. Insulating Mach. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Tinsel Rolling Mills
Amer. Insulating Mach'y Co., Phila., Pa.

MACHINERY—Trolley Wire
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Welding Wire
Micro Products Co., Chicago, Ill.
F. B. Shuster Co., New Haven, Conn.
Thomson-Judd Wire Machinery Co., Lynn, Mass.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Insulating Machinery Co., Phila.
Broden Const. Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Company, Paterson, N. J.

MACHINERY—Wire Tinning
American Insulating Mach'y Co., Phila., Pa.

PAPER—Insulating
E. W. Twitchell, Inc., Phila., Pa.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Delany Chemical Co., Tacony Station, Philadelphia, Pa.
Grasselli Chemical Co., Cleveland, O.
Wm. M. Parkin & Co., Pittsburgh, Pa.

POTS—Lead Melting
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead Encasing
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.

PULLERS—Wire
E. J. Scudder Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
John Robertson Co., Brooklyn, N. Y.

REELS AND SPOOLS—All Kinds
Apco-Mossberg Corp., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.

REEL AND TENSION STAND—
Sleeper & Hartley, Inc., Worcester, Mass.

REEL CRUTCHES
Watson Machine Co., Paterson, N. J.

REFRACTORIES—High Temperature
Norton Co., Worcester, Mass.

ROLLING MILLS—See Machinery—Rolling Mill

ROLLS—
Lewis F'dry & Machine Co., Pittsburgh, Pa.

RUST PROOF COMPOUND
American Lanolin Co., Lawrence, Mass.

SOAPS—Wire Drawing
R. H. Miller Co., Homer, N. Y.
Oak Chemical Co., Bechtelsville, Pa.

SPOOLS
Avoca Mfg. Co., Avoca, N. Y.

STRIP—Brass, Zinc and Non Ferrous
Platt Bros. & Co., The, Waterbury, Conn.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TREADS—Safety
Norton Co., Worcester, Mass.

TRUCKS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

TUBE BENDERS AND FORMERS
H. J. Ruesch Machine Co., Newark, N. J.

VALVES AND FITTINGS—Acid Proof
Duriron Co., The, Dayton, O.

VULCANIZERS
John Royle & Sons, Paterson, N. J.
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WIRE—Manufacturers
Keystone Steel & Wire Co., Peoria, Ill.

WIRE—Nickel Silver and Phosphor Bronze
Seymour Mfg. Co., Seymour, Conn.

WIRE—Non Ferrous to Specification
Seymour Mfg. Co., Seymour, Conn.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Keystone Steel & Wire Co., Peoria, Ill.

WIRE AND STRIP—Brass, Zinc
Platt Bros. & Co., The, Waterbury, Conn.

This is a carefully classified index of concerns who specialize in this industry and who advertise regularly in WIRE & WIRE PRODUCTS. Please mention WIRE when writing to these firms.

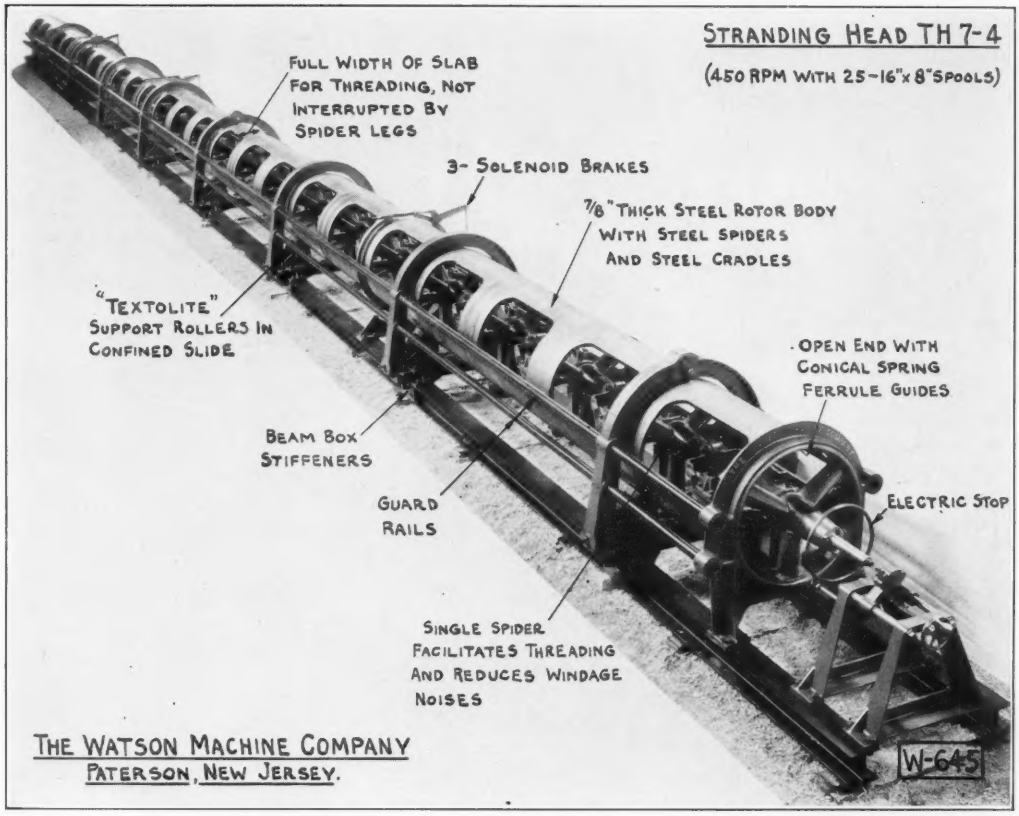
THE WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON, NEW JERSEY, U. S. A.

ENGINEERS - FOUNDERS - MACHINISTS

Tubular High Speed (All Steel Rotor) Stranders

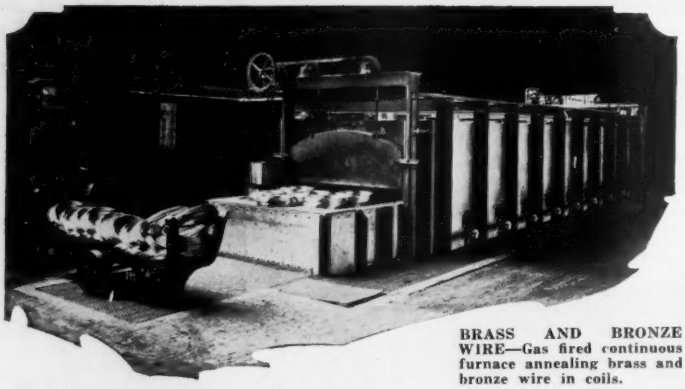

STRANDING HEAD TH 7-4
(450 RPM WITH 25-16"x8" SPOOLS)
FULL WIDTH OF SLAB FOR THREADING, NOT INTERRUPTED BY SPIDER LEGS
3- SOLENOID BRAKES
7/8" THICK STEEL ROTOR BODY WITH STEEL SPIDERS AND STEEL CRADLES
"TEXTOLITE" SUPPORT ROLLERS IN CONFINED SLIDE
OPEN END WITH CONICAL SPRING FERRULE GUIDES
BEAM BOX STIFFENERS
GUARD RAILS
ELECTRIC STOP
SINGLE SPIDER FACILITATES THREADING AND REDUCES WINDAGE NOISES
THE WATSON MACHINE COMPANY
PATERSON, NEW JERSEY.
W-645

These machines are built standard by us in spool sizes of 25, 50, 100, 250 and 500 pounds; in 7, 12, 19 and 25-spool rotors.

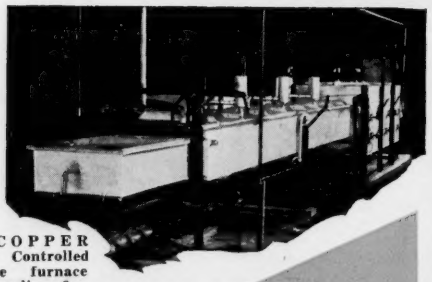
Balanced Steel Rotor Body, with Steel Cradles and Spiders. Improved Threading and Guide Arrangements, with Textolite Support Rollers, are some of the main features.

We solicit your inquiries.

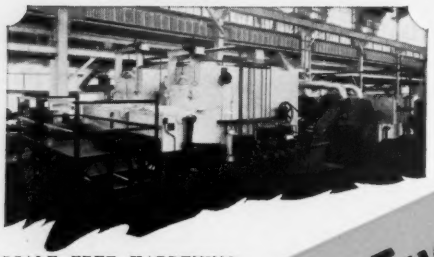
ELECTRICAL WIRE AND CABLE
WIRE ROPE and CORDAGE MACHINERY



BRASS AND BRONZE WIRE—Gas fired continuous furnace annealing brass and bronze wire in coils.



FINE COPPER WIRE — Controlled atmosphere furnace bright annealing fine copper wire on spools —continuously.

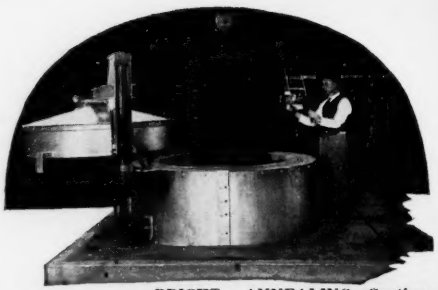


SCALE FREE HARDENING—Controlled atmosphere furnaces of the continuous type shown for treating bolts, etc.

Fuel Fired and Electric Furnaces for the Wire Industry

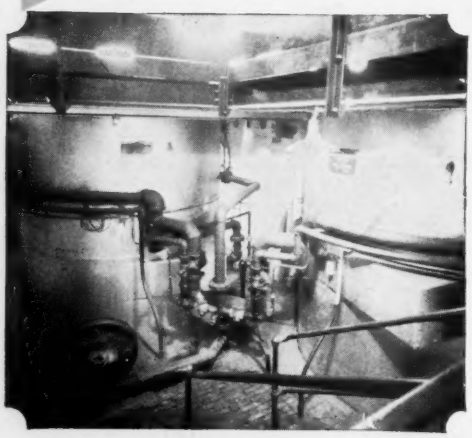
Designed and Built by

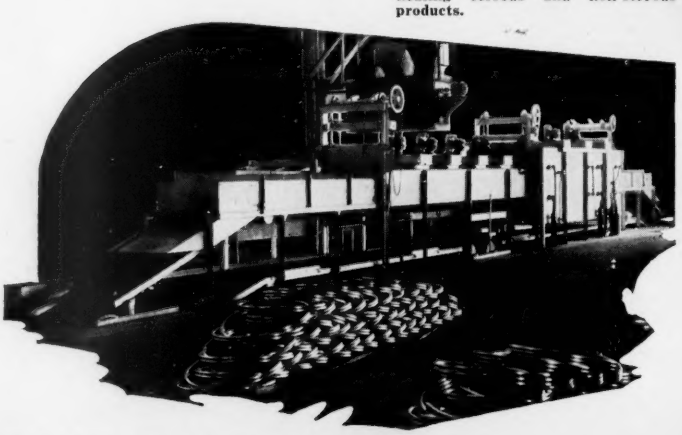
The Electric Furnace Company • Salem, Ohio



ALLOY WIRE ROD—Pit type furnace annealing alloy wire rod in coils without scale or decarburization.

LOW CARBON STEEL WIRE—New fuel-fired, pit type, wire annealing furnaces—have shown improved fuel economy, more uniform anneal and decreased annealing time.





BRIGHT ANNEALING—Continuous, controlled atmosphere furnaces designed and built for bright annealing ferrous and non-ferrous products.

WE BUILD THE FURNACE TO FIT YOUR JOB—F OR OIL, GAS OR ELECTRIC HEAT.
Put Your Problems Up To Our Experienced Engineers.

THE ELECTRIC FURNACE CO.

SALEM, OHIO.

FUEL FIRED FURNACES

ELECTRIC FURNACES